



STATE DISASTER MANAGEMENT PLAN

2023

**Disaster Management, Relief and Rehabilitation
Department**

GOVERNMENT OF MAHARASHTRA

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LIST OF ABBREVIATIONS

AMCDRR	Asian Ministerial Conference for Disaster Risk Reduction
CBO	Community-Based Organization
CBRN	Chemical, Biological, Radiological and Nuclear
CMG	Crisis Management Group
CSO	Civil Society Organization
CSR	Corporate Social Responsibility
DC	District Collector
DDMA	District Disaster Management Authority
DDMO	District Disaster Management Officer
DDMP	District Disaster Management Plan
DEOC	District Emergency Operation Centre
DM Act	Disaster Management Act, 2005
DM Act	Disaster Management
DRR	Disaster Risk Reduction
DRR-C	Disaster Risk Reduction Cell
EOC	Emergency Operations Centre
ESF	Emergency Support Function
EWS	Early Warning System
GO	Government Offices
GOI	Government of India
GOM	Government of Maharashtra
HOD	Head of Departments
HRVA	Hazard Risk Vulnerability Analysis
ICDS	Integrated Child Development Scheme of Government of India
IDRN	India Disaster Resource Network
IRS	Incident Response System
IRT	Incident Response Team
MDRR	Mainstreaming Disaster Risk Reduction
MSAAPCC	Maharashtra State Adaptation Action Plan on Climate Change
NDMA	National Disaster Management Authority
NDMP	National Disaster Management Policy
NGO	Non-Government Organization
NRHM	National Rural Health Mission
PHED	Public Health Engineering Department
PRI	Panchayati Raj Institutions
PSU	Public Sector Unit
QRT	Quick Response Team
RDC	Residential District Collector Disaster
SDMA	State Disaster Management Authority
SDMP	State Disaster Management Plan
SDRF	State Disaster Response Force
SDRN	State Disaster Resource Network
SEOC	State Emergency Operation Centre
SFDRR	Sendai Framework of Action for Disaster Risk Reduction 2015

SHG Self Help Group
SOP Standard Operating Procedure
ULB Urban Local Bodies

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PREFACE

The State Disaster Management Plan (SDMP) of Maharashtra is a “dynamic document”. It is being periodically improved in accordance with the provisions of the Disaster Management Act 2005, the guidance given in the State Policy on Disaster Management 2015 (SPDM), keeping up with the national, global best practices and the evolving disaster risk context and profile of the state. Further, it is also incumbent on all the line departments and the District Disaster Management Authorities and the line departments to update their disaster management plans annually.

The State Disaster Management Plan (SDMP) 2023 is the updated Plan. The original State SDMP was first prepared in 2014. The subsequent revised versions have been reviewed and restructured. However, the process of revision that was initiated in February 2020 experienced multiple disruptions due to the outbreak of COVID-19 pandemic and related lockdown in the following months.

The present revision is attuned to the National Disaster Management Plan 2019, broadly considering the Prime Minister’s 10-Point Agenda and the three International Frameworks viz. Sendai Framework for Disaster Risk Reduction, Paris Agreement on Change Conference (COP21) and the Sustainable Development Goals (SDGs). Emphasis is not just relief-centric disaster management a proactive, holistic, and integrated Disaster Risk Reduction (DRR) by way of strengthening disaster preparedness, response, recovery, mitigation through building the resilience of institutions, society, and community at large against disasters and climate change.

The State Disaster Management Plan (SDMP) 2023 provides a link between the National Disaster Management Plan and the District Disaster Management Plan. The State Plan provides a framework and direction to the Government agencies and the district authorities for all phases of the disaster management cycle.

The State Disaster Management Plan 2023 that evolves with time addresses the existing and emerging disaster risks of the State, stemming from ever changing nature of hazards, risks, vulnerabilities, and national priorities and commitments for providing strategic guidance to all the departments/authorities/agencies, society, and communities across the state for risk-sensitive, resilient, and sustainable development.

CHAPTER 1: INTRODUCTION

1.1. Background and Rationale of SDMP

The State Disaster Management Plan (SDMP) is the basic framework and provides guidance to all the state level government agencies and the district authorities for all phases of disaster management. The SDMP is a dynamic document and being periodically updated with national guidelines and global best practices and knowledge repository related to disaster management. The plan has been evolving with time to address the emerging disaster risks of the State, stemming from ever changing nature of hazards, risks, vulnerabilities and capacities of the institutions and communities to make development resilient and sustainable.

In accordance with the provisions of the Disaster Management Act 2005, the guidelines mentioned in the State Policy on Disaster Management 2015 (SPDM), and the established national practices, all the District Disaster Management Authorities and the line departments will have to update their disaster management plans annually. The revision of the planning process has been attuned to the paradigm shift from the relief-centric approach of the past to a proactive, holistic and integrated approach for Disaster Risk Reduction (DRR) by way of strengthening disaster preparedness, mitigation, and emergency response, as embodied in current global goals and frameworks i.e., the Sendai Framework for Disaster Risk Reduction, Paris Climate Agreement and Sustainable Development Goals (SDGs).

1.2. Vision and Mission of SDMP

Vision: The vision of this State Disaster Management Plan is to enhance Disaster Risk Management in Maharashtra (considering physical, social, cultural, economic, and environmental hazards, particularly in the disaster's mitigation and preparedness phase) to minimize the loss of lives, livelihoods & assets.

Mission: The mission of the Maharashtra State Disaster Management Plan is to incorporate the culture of risk-informed planning, enhance disaster risk governance, and institutionalize the best procedures possible to deal with any eventuality via putting structural and non-structural interventions in place.

1.3. Pillars of SDMP

The main pillars of SDMP are –

- (I) National Disaster Management Plan, 2019
- (II) Prime Minister's 10-point agenda, 2016 which is -
 - All development sectors must imbibe the principles of disaster risk management.

- Risk coverage must include all, starting from poor households to SMEs to multi-national corporations to nation-states.
- Women's leadership and greater involvement should be central to disaster risk management.
- Invest in risk mapping globally to improve global understanding of Nature and disaster risks.
- Leverage technology to enhance the efficiency of disaster risk management efforts.
- Develop a network of universities to work on disaster-related issues.
- Utilize the opportunities provided by social media and mobile technologies for disaster risk reduction.
- Build on local capacity and initiative to enhance disaster risk reduction.
- Make use of every opportunity to learn from disasters and, to achieve that, there must be studies on the lessons after every disaster.
- Bring about greater cohesion in the international response to disasters.

(III) Sendai Framework and Conference of Parties (COP 21) Paris Agreement

The adoption in 2015 of three landmark global agreements -the Sendai Framework for Disaster Risk Reduction, Sustainable Development Goals (SDGs), and COP21 Paris Agreement on Climate Change, to which India is a signatory, has opened significant opportunities to build coherence across the DRR, sustainable development and response to the climate change domains. Adopting the agenda of Sustainable Development Goals (SDGs) 'Transforming Our World' is a global transformative plan of action with poverty eradication as an overarching aim.

(IV) Maharashtra State Adaptation and Action Plan on Climate Change, 2014

(V) National Disaster Management Act, 2005

The most recent National Disaster Management Plan, 2019, explicitly outlines the ten points from the Prime Minister's Agenda for Disaster Risk Reduction, which guides the Maharashtra State Disaster Management Plan (MSDMP) 2023's overall structure and design. The Disaster Management Act of 2005 and the National Policy on Disaster Management are the salient concerns articulated through the three global frameworks of 2015—the SFDRR, SDGs, and COP 21—which are also included in the Prime Minister's 10-point agenda for DRR.

1.4. Guiding Framework

Sendai Framework for Disaster Risk Reduction (2015-2030): The third UN World Conference on Disaster Reduction in 2015 saw the adoption of the Sendai Framework because of stakeholder discussions and intergovernmental discussions. The Sendai

Framework sought to enhance stakeholder responsibility and accountability, disaster risk governance, global collaboration, and partnership in managing catastrophes, and understanding of exposure, susceptibility, and hazard in disaster risk (UNISDR, 2015).

The priorities for action for the Sendai Framework are:

- a) Understanding disaster risk.
- b) Strengthening disaster risk governance to manage disaster risk.
- c) Investing in disaster risk reduction for resilience.
- d) Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation, and reconstruction.

1.5. Guiding Principles of SDMP 2023

- (i) **Shared Responsibility:** Creating an enabling environment with clearly defined roles and responsibilities, inter and intra-departmental coordination, dialogue, and promoting knowledge transfer.
- (ii) **Disaster Resilience:** Strengthening institutional resilience via top-down and bottom-up capacity building of the pertinent stakeholders, setting up SOPs (Standard Operating Procedures) and mechanisms in place, implementing the national and international frameworks (contextualized to local needs and priorities).
- (iii) **Social Inclusion and Civil Society Learning Processes:** To promote an exchange of learning experience between institutional actors, civil society organizations (CSOs), and grassroots groups while ensuring that social inclusion is understood and used in development strategies in relation to all target groups.
- (iv) **Empowering Animation:** The interventions (whether before, during, or after the crisis) must be planned in a way that strengthens the community over the long term rather than focusing only on the urgent needs of relief and response to a disaster.
- (v) **Volunteerism:** Promoting universal social behavior and providing opportunities for many people to engage in development.

CHAPTER 2: INSTITUTIONAL ARRANGEMENTS

2.1. State Disaster Management Structure

- The Disaster Management Act 2005 provides the legal and institutional framework for disaster management in India at the national, state and district levels. In the National policy of India, the primary responsibility of disaster management vests with the State Governments. The Central Government lays down policies and guidelines and provides technical, financial, and logistic support while the state and district administration carry out most of the operations in collaboration with central and state level agencies.
- The primary responsibility for DM rests with the States. The institutional mechanisms at the Centre, State and District levels will help the States manage disasters effectively. The DM Act, 2005 mandates the State Governments, inter alia, to take measures for preparation of state DM plans, integration of measures for prevention of disasters or mitigation into state development plans, allocation of funds, establishment of early warning systems and to assist the Central Government and other agencies in various aspects of DM.
- State Disaster Management Authority (SDMA): Section 14 of National DM Act 2005 mandates each State to establish State Disaster Management Authority (SDMA). At the State Level the SDMA, headed by the Chief Minister, lays down policies and plans for disaster management. It is also responsible to coordinate the implementation of the State Plan, recommend provision of funds for mitigation and preparedness measures and review the developmental plans of the different departments of the State to ensure integration of prevention, preparedness, and mitigation measures. The Chairperson of the State Authority shall, in the case of emergency, have power to exercise all or any of the powers of the State Authority but the exercise of such powers shall be subject to ex post facto ratification of the State Authority. The Maharashtra State Disaster Management Authority was constituted in 2006 (GR. dated 11/08/2015). The constitution of present SDMA is as follows:

Table 1: Current Constitution of SDMA

#	SDMA Composition	Position
1	Chief Minister	Chair Ex. Officio
2	Minister, Revenue	Vice Chair
3	Minister, Finance	Member
4		Member
5		Member
6		Member

7		Member
8		Member
9	Chief Secretary	Ex Officio Member and Chief Executive Officer

2.2. State Executive Committee (SEC)

- i. The State Executive Committee shall have the responsibility for implementing the National Plan and State Plan and act as the coordinating and monitoring body for the management of disaster in the State.
- ii. Without prejudice to the generality of the provisions of subsection (1), the State Executive Committee may-
 - Coordinate and check the implementation of the National Policy, the National Plan, and the State Plan.
 - Examine the vulnerability of various parts of the State to different forms of disasters and specify measures to be taken for their prevention or mitigation.
 - Lay down guidelines for preparation of state/district disaster management plans.
 - Monitor the implementation of disaster management plans prepared by the departments of the Government of the State and District Authorities.]
 - Monitor the implementation of the guidelines laid down by the State Authority for Integrating of measures for prevention of disasters and mitigation by the departments in their development plans and projects.
 - Evaluate preparedness at all governmental or non-governmental levels to respond to any threatening disaster situation or disaster and give directions, where necessary, for enhancing such preparedness.
 - Coordinate response in case of any threatening disaster situation or disaster.
 - Give directions to any Department of the Government of the State or any other authority or body in the State about actions to be taken in response to any threatening disaster situation or disaster.
 - Promote general education, awareness, and community training regarding the forms of disasters to which distinct parts of the State are vulnerable and the measures that may be taken by such community to prevent the disaster, mitigate and respond to such disaster.
 - Advice, aid and coordinate the activities of the Departments of the

Government of the State, District Authorities, statutory bodies, and other governmental and non-governmental organizations engaged in disaster management.

- Supply necessary technical aid or give advice to District Authorities and local Authorities for carrying out their functions effectively; (Advise the State Government about all financial matters in relation to disaster management.
- Examine the construction, in any local area in the State and, if it is of the opinion that the standards laid for such construction for the prevention of disaster is not being or has not been followed, may direct the District Authority or the local authority, as the case may be, to take such action as may be necessary to secure compliance of such standards.
- The State Executive Committee will handle forming subcommittees and inviting subject experts from outside for specific advice and functions. Other departmental secretaries and Director CDM, YASHADA could be invited as invitee members as deemed fit.
- The State Executive Committee will hold quarterly meetings during non-emergency times to review progress on DM Plans, to consider any policy issues and financial requirement. Emergency meetings will be called at the Chair's discretion.

2.3. State Disaster Response Force (SDRF)

Maharashtra is a multi-disaster-prone State. It is vulnerable to natural disasters like floods, cyclones, earthquakes, landslides etc. as well as human-induced disasters like fire, building collapses etc. The National Disaster Response Force has been constituted at the National level for effective response to such disasters. One battalion of the NDRF is posted in Sudumbre in Pune to respond to these disasters. However, this battalion handles covering Maharashtra, Gujarat, and Goa. Also, as time is a crucial factor after a disaster has occurred for effective response, it is difficult for the NDRF to respond quickly to disasters that may occur in Vidarbha or Marathwada. It is also the mandate of the NDMA (National Disaster Management Authority) that every state must become self-sufficient in this regard and constitute a SDRF of their own. The SDRF is formulated in state and is functional in the following ability.

- Two Companies of the SDRF will be created in the State on the lines of the NDRF.
- Every Company will consist of 3 teams. Every team will have 45 members. To handle the establishment matters for the force, more posts will be created. In total the SDRF will consist of 428 members. This will include the field level officials and the support staff.
- Initially, the posts will be filled on deputation basis from SRPF for 5 years. The

selection criteria will be finished by a committee consisting of the Secretary, DMU, DG Maharashtra Police and Commandant NDRF. The salary part will be borne by the SDMA with a 10% incentive to the members of the SDRF over their current salary.

- The NDRF and State Reserve Police Force (SRPF) will impart training to the SDRF.
- The other matters on the positioning of the force, establishment matters, location of headquarters, etc. will be decided by the State Executive Committee of the SDMA.

2.4. State Emergency Operation Centre (SEOC)

This is a facility that will be primarily established at Mantralaya premises in Mumbai. To create redundancy in case of emergency, additional EOC could be established and kept as reserve for activation on orders at the Centre for Disaster Management, Pune within this plan period. Both the EOCs should be identically functional. The EOC at Mantralaya will function 24 X 7 round the year. During non-emergency time it will function as a 'Watch and Ward' regime and during emergencies, it should be activated ba full scale within a short timeframe of 2 to 3 hours. The Mantralaya EOC's structure, detailed SOPs on roles and responsibilities of the stakeholders and the functional aspects will be given separately along with its equipment profile.

The functions of EOC during Non- Emergency time are –

- Keep the EOC functional in all respects to be able to perform the duties fully during emergency times.
- Keep maps updated with latest development details in each district map and overallstate map.
- Keep resource data and GIS maps updated and update the IDRN and State DisasterResource Data on computers.
- Plot state response forces on the map.
- Keep communication links active.
- Receive daily feedback from the districts and Municipal Corporations regarding any incidences and maintain telephone and radio logs.
- Keep contact details of all state level and district level stakeholders and response forces of state and central government and of various institutions identified as stakeholders.
- Maintain the latest state and district disaster management plans including mutual aid schemes.
- Media management as and when required with only the authorized PR Officer interacting.
- Internal funds accounting and management.
- Keep EOC staff well trained.

The functions of EOC during Emergency time are –

- Ensure passage of information to the CM, Chief Secretary, Minister R&R, Secy. R& R, Director DMU, and all members of the SDMA and State Executive Committee.
- Maintain communications between the EOC and the district(s) facing emergencies and get periodic feedback from them.
- Maintain emergency time event logs.
- Plan of meetings of the stakeholders in the EOC.
- Keep track of all info and intelligence for dissemination to all concerned.
- Ensure dissemination of orders/ information to all districts/ divisions/ Municipal Corporation and National EOC
- Media management

2.5. Institutional arrangement for Drought Management

State Drought Relief Commissioner: Secretary in Relief and Rehabilitation of Revenue and Forest Department is the State Drought Relief Commissioner who is assisted by drought management section consisting of one Deputy Secretary, one Section Officer, one Assistant Section Officer in the department. The section deals with declaration of drought, sanctioning of relief and collating information from various departments and agencies needed for declaration of drought.

State Level Drought Monitoring Committee: The State has constituted a state level drought monitoring committee under the chair of Commissioner, Agriculture having experts from Groundwater Survey and Development Agency, State Remote Sensing Application Centre, Hydrology department. The State level committee monitors the drought situation in all districts based on the reports received from the district level committees and submits its report to the Relief Commissioner.

District Level Drought Monitoring Committee: The State Government has set up District Level Drought Monitoring Committee in each district under the Chairmanship of District Collector with officers from various departments dealing with agriculture, groundwater survey and development agency, water resources department. The district level committee monitors the drought situation in the district based on various indicators enumerated in the manual for drought management, 2016. The committee monitors the situation monthly and submits its report to the state-level committee.

Crisis Management Group: The Crisis Management Group has been constituted under the chairmanship of Relief Commissioner with secretaries of all major line departments to take review of the drought situation in the State.

Crisis Management Plan (CMP): The CMP is an actionable program which will be pressed into action in the event of drought, to minimize the damage to life. It explains the roles and responsibilities of various departments in managing the drought

effectively. This plan is focused on management interventions needed during drought situations. (A detailed Drought Management Plan is made as per the directions of the Honorable High Court).

CHAPTER 3: HAZARD, RISK, VULNERABILITY ANALYSIS

3.1. Climate Change and Disaster Management in Maharashtra

In 2008, the Government of India released the National Action Plan on Climate Change (NAPCC), and in August 2009, directed the states to develop State Action Plans on Climate Change (SAPCC) guided by and consistent with the structure and strategies of the NAPCC. The Government of Maharashtra took a pioneering step towards formulating the Maharashtra State Adaptation Action Plan on Climate Change (MSAAPCC) by commissioning a comprehensive vulnerability assessment study, which included the task of generating model-based climate projections, specific to the state's geography. The Government of Maharashtra appointed The Energy and Resources Institute (TERI) in 2010 to carry out a study¹, which broadly aimed to “address the urgent need to integrate climate change concerns into the state's overall development strategy, thus assisting in building long term climate resilience and enabling adaptation to the likelihood of risks arising from climate change”. The study outputs have been used to formulate the Maharashtra State Action Plan on Climate Change (MSAPCC).

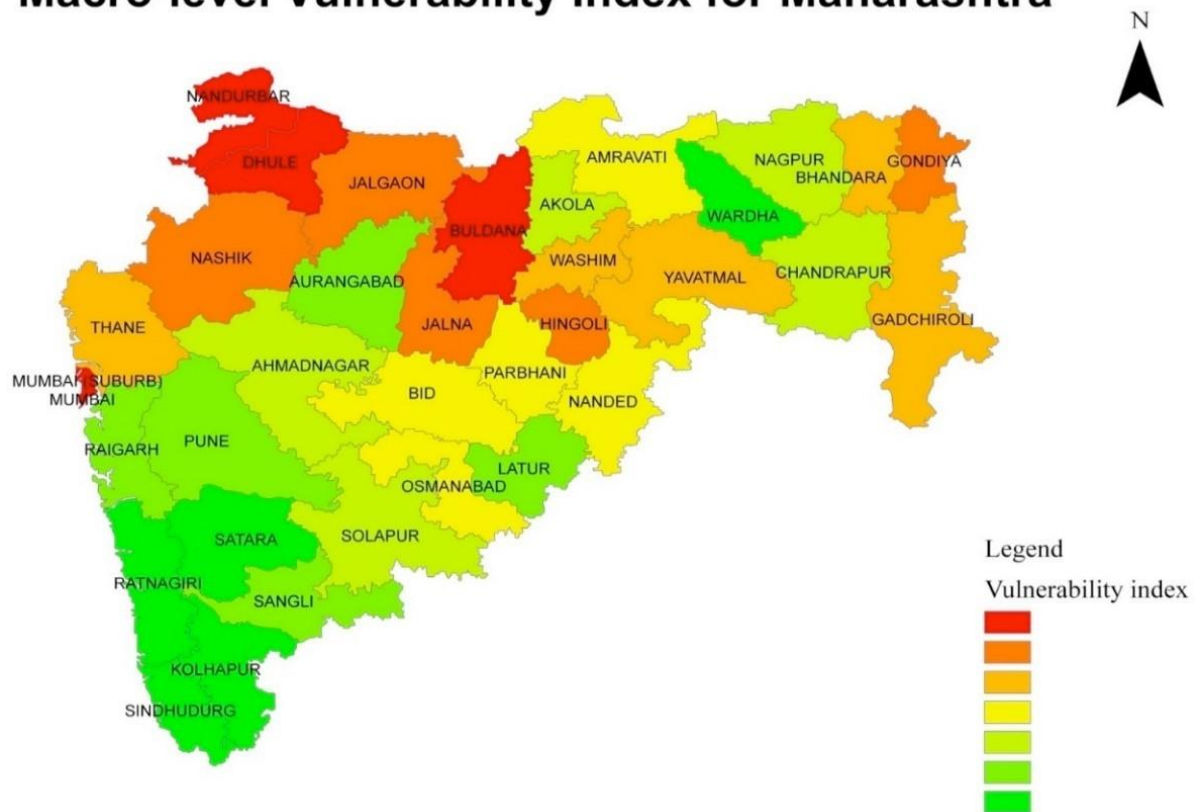
For the modeling component of the study, TERI entered a partnership with the UK Met Office to assist in the development of climate projections for the state. Using the high resolution '*HadRM3P*' model to represent the climatic pattern over the state's topography to a good degree, changes in temperature and rainfall were projected at a resolution of about 25 km x 25 km. These projections related to three future time slices during the 21st century – 2030s, 2050s, and 2070s, with respect to the model baseline, which was the average climate during 1970-2000.

The climate modeling results show that temperature and rainfall are projected to increase all over the state, although there are regional variations. Amravati and Aurangabad divisions may experience a greater rise in annual mean temperature than other parts of the state. Temperature increase is projected from minimum 1.1 °C in Konkan to maximum 3.46 °C in Amravati division up to 2070. The projected increase in monsoon rainfall by the 2030s and 2050s is relatively more for Amravati and Nashik divisions. Rainfall increase is projected from lowest 10% in Southern Maharashtra to highest up to 40% in Northern Maharashtra. Extreme rainfall is projected to increase in all regions with greater increases in northern parts of the state. This overall increase in monsoon rainfall for the state is consistent with the findings of Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). The model results were validated using several observational datasets including those of the India Meteorological Department (IMD). Four priority areas were considered for further assessments: (a) Hydrology & freshwater resources, (b) Agriculture & food systems, (c) Coastal areas, marine ecosystem, and biodiversity and (d) Livelihood (including migration and conflict).

Additionally, some cross-cutting areas were identified including issues related to human health, ecosystem and biodiversity, markets, and risk management. Based on the sector and cross-sectoral impact and vulnerability assessments and taking account of the regional diversity within the state, the study developed key recommendations for the selected sectors along with implementable adaptation measures.

An important component for this included the development of a Macro Level Vulnerability Index (MLVI), which identified the most vulnerable districts in the state. The MLVI is comprised of 19 indicators under the categories of exposure, sensitivity, and adaptive capacity to assess the vulnerabilities of the districts. The corresponding data specific for all the districts was analyzed to develop the index. A ranking exercise was undertaken for the districts on the basis of the vulnerability index which ranked Nandurbar as the most vulnerable district, followed by Dhule and Buldhana. Satara was regarded as the least vulnerable district, whereas Ratnagiri and Sindhudurg were also considered less vulnerable as compared to other districts. Figure 1 below represents the Macrolevel Vulnerability Index of all districts in Maharashtra.

Macro-level Vulnerability Index for Maharashtra



District wise ranks for macro level vulnerability index and contributing factors are given in the following table:

Table 2: District-wise ranks for macro level vulnerability index and contributing factors.

District Name	Exposure	Sensitivity	Adaptive Capacity	Vulnerability Index
Ahmednagar	20	26	9	20
Akola	4	6	11	21
Amravati	13	8	20	16
Aurangabad	12	1	13	27
Bhandara	19	30	10	11
Bid	24	16	22	14
Buldhana	8	17	32	3
Chandrapur	23	28	6	22
Dhule	2	19	29	2
Gadchiroli	27	33	14	10
Gondia	18	31	15	8
Hingoli	15	21	31	5
Jalgaon	1	13	26	4
Jalna	17	18	30	7
Kolhapur	32	20	8	30

Table 3: Overall state profile of Maharashtra

Geographical Area ('000 sq. km.)	308
Administrative Setup	
Revenue Divisions	6
Districts	36
Talukas	355
Local Self Government Institution	
Zilla Parishad	34
Gram Panchayats	27832
Panchayat Samitis	35
Municipal Councils	244
Municipal Corporations	27
Nagar Panchayats	139
Cantonment Boards	7
Population as per Census 2011 in' 000	112374
Male	58243
Female	54131
Rural	61556
Urban	50818

3.1.1. Major Flood Events in Maharashtra

The major flood events that have occurred in Maharashtra from the year 2002 to 2020 is as stated in the table below -

	Year	Description of the flood event	Districts affected
1	2005	Floods occurred during 29 th Jul -5 th August and 17 th Sep 2005 due to heavy rains	5
2	2006	Many low-lying areas in parts of Maharashtra's Vidarbha region were inundated due to rains during 10-13 th Aug 2006	4
3	2013	Floods were reported in Maharashtra state during last week of July, 2013	9
4	2016	Floods were reported in first week of August in the state of Maharashtra due to heavy torrential rains during 1 st week of 2016	4
5	2019	Floods were reported in first week of August in the state of Maharashtra due to heavy torrential rains during 6-15 th Aug 2018	6
6	2020	Heavy incessant rains lashed Maharashtra during the third week of August, 2020.	3
7	2022	Heavy incessant rains were reported in various parts of Maharashtra in July & August 2022.	8

3.1.2. District-Wise Statistics of Flood Affected Area in Maharashtra.

The district wise flood affected areas in Maharashtra is as per the statistics stated in the table below-

S. No.	District	Flood Affected Area (ha)
1	Chandrapur	54009
2	Kolhapur	46304
3	Garhchiroli	38847
4	Bhandara	16915
5	Yavatmal	13930
6	Sangli	13925
7	Bid	11065
8	Jalna	9676
9	Wardha	6172
10	Nanded	5819
11	Solapur	3873
12	Akola	3184
13	Nashik	3075
14	Parbhani	1876
15	Ahmadnagar	1785
16	Raygad	1300
17	Gondiya	819
18	Hingoli	462
19	Amravati	399
20	Nagpur	155
TOTAL		233590

3.2. Hazard, Risk, Vulnerability Analysis

A hazard is an event or physical condition that can cause fatalities, injuries, property

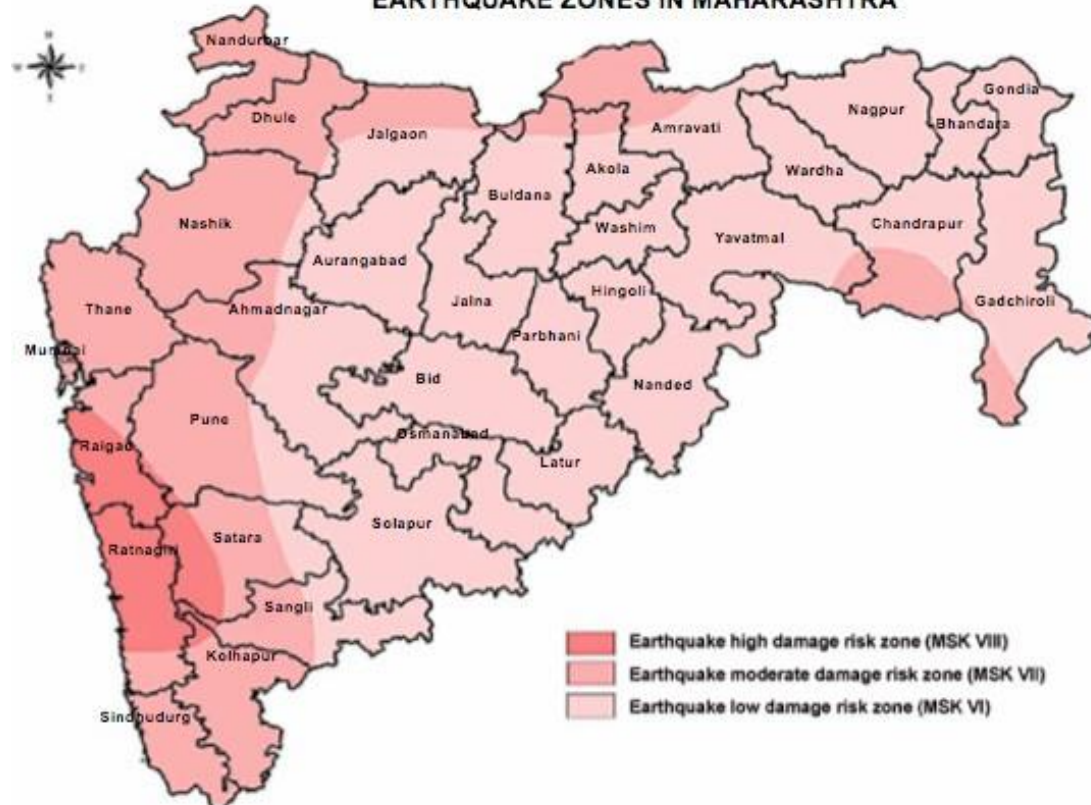
damage, infrastructure damage, agricultural losses, damage to the environment, interruption of business, or other types of harm or loss. Earthquakes, floods, and wildfire hazards represent the pervasive and primary events that result in disaster losses. Secondary hazards include dam failure, landslides, and tsunamis.

Vulnerability indicates the level of exposure of human life and property to damage from natural and human-induced hazards. In Maharashtra, people are vulnerable to a wide range of hazards that threaten communities, businesses, government, and the environment in each State.

3.2.1. Earthquake

The most seismic active region in Maharashtra is the west coast – Western Ghats. The Koyna-Warna and the Bhatsa areas are in this region and an earthquake with magnitude 6.5 occurred on 11 December 1967. Based on past earthquakes the west coast and West Ghats belt is highly prone to seismic movements. The major spots where seismic activity noticed during last few years are near Ratnagiri, along the western coast, Koyna Nagar, Bhatsa and Surya areas of Thane district.

EARTHQUAKE ZONES IN MAHARASHTRA



For the last few years isolated seismic activity has been seen near Nanded, Beed, Ujjani and Solapur in eastern Maharashtra and Uran, Kolhapur and Sindhudurg in south-west Maharashtra. Frequent shocks have been recorded in Nanded for the last few years. In south-east Maharashtra isolated activity has also occurred in Latur-Osmanabad districts. Near Dhule, Akola, Jalgaon and Amravati in North Maharashtra the seismic activity could have occurred due to movements of

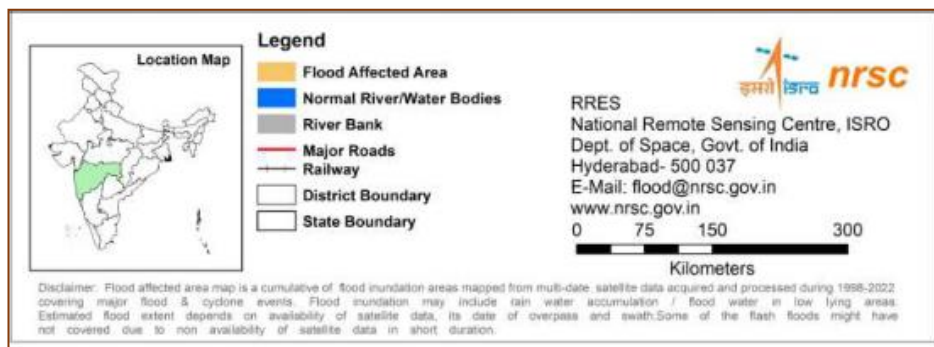
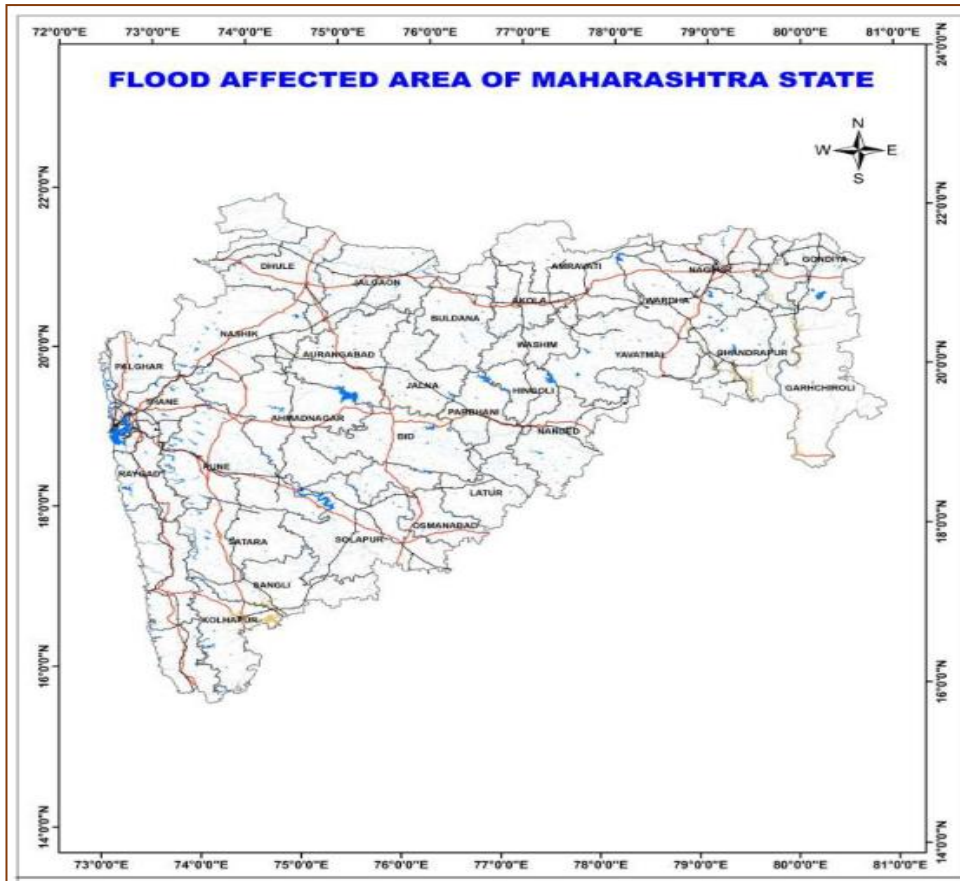
faults existing in the complex system of river Narmada, Tapi and Purna lineaments. It is observed that in north-east corner of Maharashtra, Nagpur and Bhandara districts may have shocks because of faults associated to Ramtek and Sakoli Basins.

The impact of earthquake is very severe as there is no prediction about its occurrence. It may occur at any time. If it takes place at night, the loss of lives will be more along with property and environment. In rural area people will lose their crops, houses, irrigation infrastructures and livelihood sources whereas in urban areas the physical structures will be destroyed along with service infrastructures such as water supply, sewage, telephones, electricity, piped gas supply etc., which are underground installations and hence exposed to a direct impact. The disruption in urban areas and consequent investments for rehabilitation becomes a major challenge.

3.2.2. Flood

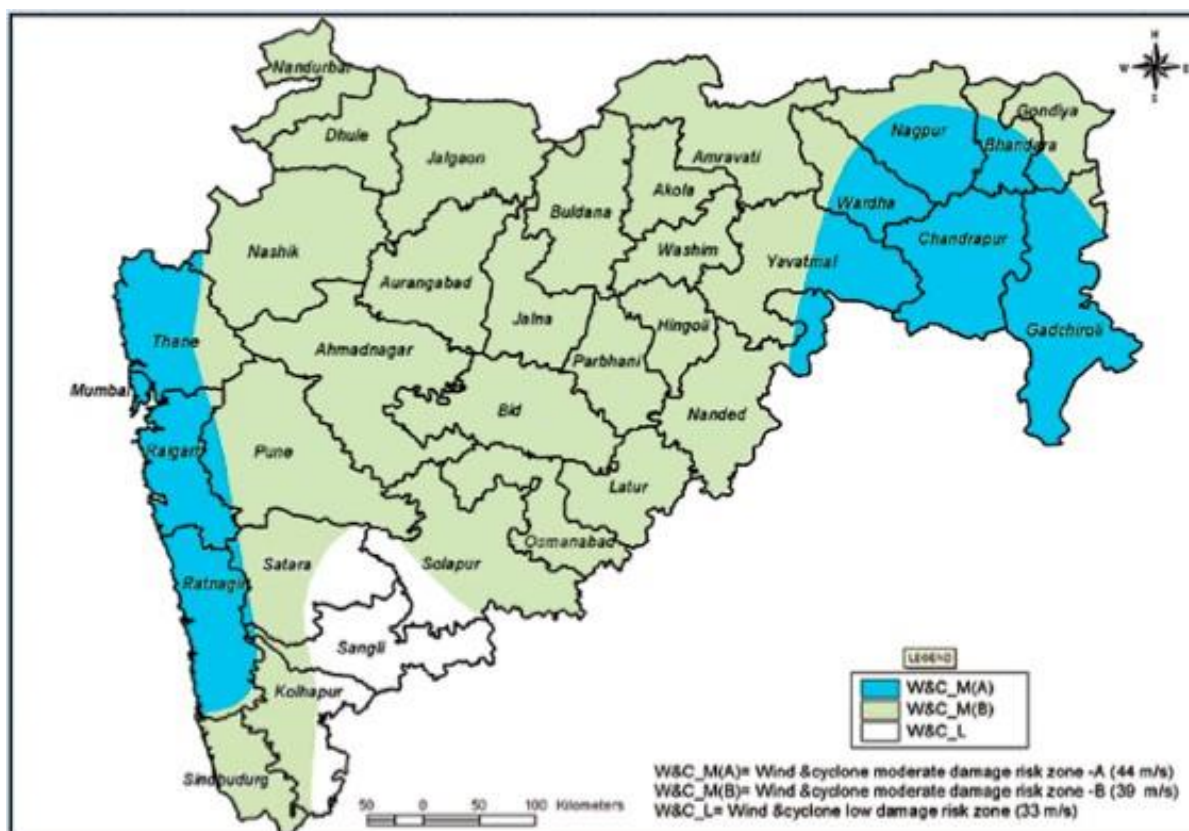
Maharashtra is vulnerable to floods. It may be noted that there is many man- made reasons for the occurrence of floods. Analyzing the floods in Maharashtra, one observes that most floods in Maharashtra are flash floods due to nallah-overflows and poor drainage systems. Very few floods, like the one in Konkan in 1983, are due to heavy rains in the region. Major flood events post 2005 are floods of 2013, 2016, 2019, 2020, 2022. The last four floods itself (2019, 2020, 2021, 2022), have caused 1246 loss of lives as indicated in the table below. Floods kill by destroying houses, crops, and food stocks. They strip farmlands, wash away irrigation systems and erode large areas of land or make them unusable otherwise.

S.No.	Year	No. of lives lost
1.	2018-19	108
2.	2019-20	354
3.	2020-21	184
4.	2021-22	377
5.	2022-23	223
Total		1246



3.2.3. Cyclone

The coastal areas are risk prone to cyclones. Maharashtra has a coastal belt of over 720 kilometers between Gujarat to Goa. Thus, the Konkan region including Mumbai becomes prone to cyclones. There are many marine fishing villages / hamlets with fishing boats, engaged in fishing in this coastal belt. Cyclones make impact by killing people, damaging property, crops, and infrastructure. In the rural areas, the damage is primarily to lives, crops and to housing. It may also affect the irrigation infrastructure. The damage to forests and plantations, when it occurs, has a long-term effect and takes a much longer period for restoration.



In urban areas, both transport and communication receive severe damage, in addition to loss of life and shelter. In the Arabian Sea, severe cyclonic storm has been recorded in past which have affected Maharashtra -Goa coast. Mumbai is a coastal city which has faced many threats of cyclones in the recent past. It faced peripheral impact in 1982, 1988 and October 1996 and was hit twice by cyclones (1948 and June 1996). The data indicates that the city is prone to cyclones. The most recent to hit the State was cyclone Okhi in 2016, cyclone Nisarg in 2022, cyclone Tauktae in 2021 caused huge damage to the coastal areas.

Deaths & Injured Caused Due to Nisarga Cyclone						
Sr.No	Division	District	Total No. of Deaths		Total No. of Injured	
			Humans	Animals	Humans	Animals
1	Konkan	Thane	0	3	0	0
2		Palghar	0	0	0	0
3		Raigad	6	41	5	0
4		Ratnagiri	0	13	8	0
5		Sindhudurg	0	0	0	0
6	Pune	Pune	4	26	3	0
7	Nashik	Nashik	0	56	0	0
8		Dhule	1	3	0	0
9		Ahmednagar	1	23	4	0
			12	165	20	0

Sr. No.	District	Structural Damage		Casualties				Evacuated Population
		Partially	Fully	Human Lives		Animal Lives		
				Death	Injured	Death	Injured	Population
1	Mumbai	80	Nil	1+62#	9	Nil	Nil	Nil
2	Thane	566	7	3	8	0	0	53
3	Palghar	436	0	3	2	1	0	200
4	Raigad	6092	11	4	7	2	0	8409
5	Ratnagiri	1916	10	2*	8	5	0	4563
6	Sindhudurg	3797	53	4	3	3	1	200
7	Pune	101	0	0	0	0	0	Nil
8	Kolhapur	27	0	0	0	0	0	Nil
9	Satara	6	0	0	0	0	0	Nil
10	Jalgaon			2**				
Total		13021	81	81	37	11	1	13425

*Ratnagiri 2 Deaths due to electric wire

** Jalgaon 2 Deaths due to Tree fall

ONGC Casualty Barj P-305

3.2.4. Drought

Drought is a natural hazard that differs from other hazards since it has a slow onset and evolves over months or even years and affects a large spatial extent and causes little structural damage. It is a creeping disaster. If dealt with systematically, it will help reduce the impact of drought on society. It has broken the backbone of farmers in Vidarbha and Marathwada regions in Maharashtra. Rainfall deficiency, dry spells, depleting ground water levels, drying wells, deficiency in reservoir levels, poor vegetation condition warn the onset of drought.

3.2.5. Landslide

In Maharashtra, landslides are often triggered by heavy rains in the Western Ghats. Major landslide major incidents have occurred in monsoon seasons due to anthropogenic development along the landslide prone regions. Landslides have resulted in loss of life and property but have led to secondary and tertiary impacts such as chemical accidents, road accidents, rail accidents, floods, fire, gas leaks, etc.

Causes of Landslides in Maharashtra are as follows -

- **Geological Weak Materials:** Weathered materials, jointed materials, contrast in permeability and contrast in stiffness.
- **Soil Erosion:** Wave erosion of slope toe, glacial erosion of slope toe, subterranean erosion (vegetation removal).
- **Heavy Rainfall:** Intense rainfall lasts for few hours or few days caused abundant landslides.
- **Human Excavation:** Human excavation of slope and its toe, loading of slope/toe, draw down in reservoir, mining, deforestation, irrigation, vibration/blast, water leakage from services.
- **Earthquake Shaking:** Seismic activity has triggered landslides in many different topographic and geologic settings. Rock falls, soil slides and rockslides from steep slopes.
- **Volcanic Eruption:** Deposition of loose volcanic ash on hillsides commonly is followed by accelerated erosion and frequent mud or debris flows triggered by intense rainfall.
- **Risk Elements:** The most common elements at risk are the settlements built on the steep slopes, built at the toe and those built at the mouth of the stream emerging from the mountain valley. All those buildings constructed without appropriate foundation for a given soil and in sloppy areas are also at risk. Roads, communication lines and buried utilities are vulnerable.
- **Hazardous Areas:** Canyon bottoms, stream channels, areas near the outlets of canyons, and slopes excavated for buildings and roads are the most hazardous areas for landslides.
- **Physical Damage:** Landslides destroy anything that comes in their path. They block or bury roads, lines of communication, settlements, river flow, agricultural land, etc. It also includes loss to agricultural production and land area. In addition, physical effects such as flooding may also occur.
- **Causalities:** They cause maximum fatalities depending on the place and time of occurrence. Malin landslide in Pune district of Maharashtra is an example of such type, which killed many people.

CHAPTER 4: DISASTER PREVENTION AND MITIGATION MEASURES

4.1. Introduction

Prevention consists of actions that reduce risk from natural or human made disaster incidents. Prevention includes actions or measures taken to cover or shield assets from exposure, injury, or destruction. Prevention activities are designed to provide permanent protection from disasters. Not all disasters, particularly natural disasters, can be prevented, but the risk of loss of life and injury can be mitigated with good evacuation plans, environmental planning, and design standards. These activities are designed to minimize loss of life and damage.

Mitigation, with its focus on the impact of a hazard, encompasses the structural and non-structural approaches taken to eliminate or limit a hazard's exposure, impact on people, property, and the environment. Under prevention and mitigation phase structural and non-structural measures are taken up to reduce the risk from natural and unnatural disasters. Common structural measures for disaster risk reduction include construction of dams, floodwalls, ocean wave barriers, earthquake-resistant structures, and evacuationshelters. In short, engineering measures, construction of hazard resistant structures, and protective infrastructures are the major structural measures. And common non- structural measures refer to awareness and education, policy, techno-legal systems, building codes, land use planning, and practices, training, capacity building etc.

4.2. Drought

4.2.1. Monitoring of Drought and Early Warning

The revised Manual for Drought Management 2016 of the Department of Agriculture, Cooperation and Farmers' Welfare has discussed rainfall, vegetative indices, soil moisture and hydrological indices in a cogent matrix for assessment of drought. A drought management cell in DM division of Government of India is created to help collate information from diverse sources, monitor drought conditions, issue advisories and coordinate with other ministries, state governments to mitigate the effect of drought.

As far as the State is concerned the district level drought monitoring committees and State level drought monitoring committees have been set up to meet periodically to monitor the drought conditions. The district level drought monitoring committees monitors the following parameters that may indicate an onset of drought like condition: Rainfall deviation and dry spell; Crop sown area; Remote sensing based vegetative indices; Soil moisture indices; Hydrological indices.

4.2.2. Early Indicators of Drought

The following constitute early warning indicators of drought-

- Delay in onset of monsoon
- Dry spell during monsoon season
- Insufficient rains and skewed spatial distribution particularly during sowing period
- Rise in fodder prices
- Absence of rising trend in reservoirs level
- Drying up of sources of rural drinking water supply
- Out migration of rural population
- Increased trend of water through tankers

Drought monitoring checklist is given below:

Table 4: Drought monitoring checklist

Data	Indicator	Source
Meteorological data	Rainfall and dry spell	Rain gauges were established at circular levels. The data is available on http://krishi.maharashtra.gov.in
Hydrological	Groundwater Drought Index (GWDI)	Groundwater Survey and Development Agency under Water Supply and Sanitation Department
Agricultural	Crop Sown Area and moisture adequacy index	District level offices of the Agriculture Department. The soil moisture index data is available on MNSFC website
Remote Sensing Vegetative Indices	NDVI/NDWI/VCI	The data is made available on the MNCFC website at the block level
Socio-Economic data	Availability and prices of food grains, fodder, migration of Population	Food and Civil Supply Department, Department of Animal Husbandry, EGS and Water Conservation Department

4.2.3. Preventive and Mitigation Measures

The containment and mitigation of the crippling impact of drought and the eventual attainment of the objective of drought proofing of an area is contingent upon a proactive and relentless but planned pursuit of a combination of structural, physical long- and short-term measures. The short-term measures are mostly reactive or relief centric in nature and mostly relate to in season drought management through

contingency planning and relief distribution. Long term mitigation measures are geared toward the adaptation to climate change, restoration of ecological balance through adoption of sustainable agronomic and conservation practices, sensible crop choices etc. Most of these measures are translated on the ground through soil and water conservation, watershed management, agronomic practices suited to rain fed agriculture and forestry programs that seek to integrate soil, water, and forestry management in an ecological compliant and sustainable manner.

4.2.4. Drought mitigation

Drought mitigation must be included in the State Government's regular development programs. Some of the most significant current national programs and State government programs that may have a decisive bearing on drought mitigation are Pradhan Mantri Krishi Sinchayee Yojna, National Rain fed Area Development Program, National Rural Drinking Water Program, Jalyukta Shivar, Afforestation activities through forest department etc.

Pradhan Mantri Krishi Sinchayee Yojna has been formulated with vision of extending the coverage of irrigation ' Har Khet Ko Pani' and improving water use efficiency 'More Crop Per Drop '. This program deals with focus on faster completion of ongoing major and medium irrigation projects, ground water development, lift irrigation, diversion of water from water plenty to water

scarce areas, supplementing rainwater harvesting, repair, restoration and renovation of traditional water bodies, use of micro irrigation system for efficient use of available water etc. The departments involved in implementation of various aspects of this program are Water Resources Department, Agriculture Department, and Water Conservation Department.

4.3. Flood

Flood mitigation is different in urban landscape and rural context. This includes engineering measures and flood preparedness with the understanding of the landscape's ecological and hydrological functions. Modifying susceptibility to flood damage and disruption is the floodplain management strategy of avoiding dangerous, uneconomic, undesirable, or unwise use of the floodplain. The tools used to implement this strategy are regulations, development and redevelopment policies, flood roofing and elevation.

4.3.1. Structural and non-structural measures

Development of Regulations:

Task	Activities	Responsibility
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Development of techno-legal regime/ regulations	<ul style="list-style-type: none"> • Prohibition of development in wetlands, flood zone and low-lying areas • Encourage for flood proofing structures in flood prone areas • Build new water and sewage systems and utility lines. • Prescribing standards for different flood prone zones on flood maps • Enactment and enforcement of laws regulating in developmental activities 	<ul style="list-style-type: none"> • Revenue Dept. • Irrigation Dept. • Urban Development Dept, Panchayat & Rural Housing • Local Governments
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Safe spaces in Flood hazard:

Task	Activities	Responsibility
Arrangement of Safe spaces in flood vulnerable area	<ul style="list-style-type: none"> • Study of Flood history • Development of flood hazard map • Assess the Flood risk in the areas • Regulations for flood safe buildings 	<ul style="list-style-type: none"> • Relief and Rehabilitation Department • Irrigation Department • Urban Development Department • Rural Development • PRIs

Task	Activities	Responsibility
Arrangement of safe siting in flood hazard areas	<ul style="list-style-type: none"> • Development of flood hazard map • Study of history on floods occurred and estimated loss and damage. • Asses the vulnerability of risk elements • Build houses in safer zone 	<ul style="list-style-type: none"> • Revenue Dept. • Irrigation Dept. • UD Dept, Panchayat & Rural Housing • Local Governments

Roles and Responsibilities:

Task	Activities	Responsibility
Arrangement of safe siting in flood hazard areas	<ul style="list-style-type: none"> • Development of flood hazard map • Study of history on floods occurred and estimated loss and damage. • Asses the vulnerability of risk elements • Build houses in safer zone 	<ul style="list-style-type: none"> • Revenue Dept. • Irrigation Dept. • UD Dept, Panchayat & Rural Housing • Local Governments

Development and Redevelopment Policies:

Task	Activities	Responsibility
Development and redevelopment of flood preventive policies	<ul style="list-style-type: none"> • Develop long term flood policies to protect natural resources, property and lives. • Legislative and regulatory requirements. 	<ul style="list-style-type: none"> • Revenue Department • Irrigation Dept. • UD Dept, Panchayat & Rural Housing • Local Governments

Flood Forecasting and Warning System:

Updating of flood forecasting and warning system	<ul style="list-style-type: none"> • Strengthening and upgradation of existing flood forecasting system • Stay in touch with IMD and CWC • Establish infrastructure for flood warning and dissemination. • Ensure proper communication between district authority and SEOC. 	<ul style="list-style-type: none"> • Director DMU • Irrigation Dept • CWC • IMD
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Timely forecasting helps people in taking some preparedness measures and protect their lives and properties with all possible efforts. Thus, flood forecasting and early warning system should be updated and kept in place by concerned authorities.

Non-Structural Measures:

Task	Activities	Responsibility
Capacity Building	<ul style="list-style-type: none"> • Prepare departmental flood contingency plan • Establish rain gauge recording station with trained manpower in the State • Train the flood rescue teams and ensure 	<ul style="list-style-type: none"> • Revenue Dept. • Director DMU • Irrigation Dept • Line Dept.
	<ul style="list-style-type: none"> • Conduct demos/mock drills in flood prone areas from time to time and ensure that rescue teams are properly trained and equipped. • Organize training for various stakeholders involved in flood mitigation and management. • Organize mock drills on flood rescue 	
Awareness Generation	<ul style="list-style-type: none"> • Undertake public awareness activities in flood affected areas and let people know what to do and what not to do after, before and during flood. • Design and develop the IEC materials in local language and ensure their storage and distribution among people. • Motivate all families in flood prone areas to prepare the family kit of emergency materials. 	<ul style="list-style-type: none"> • Revenue Dept. • Director DMU • Irrigation Dept • SDMA • Information Dept. • Line Dept.

4.4. Earthquake

4.4.1. Structural Measures

Zoning and Building Codes:

Task	Activities	Responsibility
Zoning and Building Codes	<ul style="list-style-type: none"> • Conduct micro-zonation study and prepare seismic map in earthquake prone locations. • Identify the vulnerable structures. • Adapt building code and suggestions given by micro zonation study and do construction works accordingly 	<ul style="list-style-type: none"> • Revenue Dept. • Director DMU • UD Dept. • PWD Dept. • Gram Panchayats • Local Urban Bodies • Housing Dept.

It is essential to conduct Rapid Visual Screening (RVS) of the existing building stock as a preliminary step of building vulnerability assessment. This process will help to scrutinize the highly vulnerable buildings requiring further evaluation and retrofitting. RVS helps in prioritizing the structures for retrofitting. Initial focus for structural safety audit and retrofitting can be on government and public buildings. This activity needs to be carried out in a phased manner. Technical guidance should be provided by the nodal agency to owners of the private buildings. Seismic strengthening is also required for non-structural elements in the buildings such as building finishes, cladding, water tanks and heavy elements inside buildings such as furniture, hanging walls and roof elements. In seismic zone property insurance mainly in new constructions should be done as a mitigation measure. The weak structures in seismic zone should be avoided and vacated in time.

Instrumentation for monitoring of seismic activity

Task	Activities	Responsibility
Regular monitoring of seismic activities	<ul style="list-style-type: none"> • Set up seismic recording stations in seismic prone areas with modern equipment. • Ensure regular study and research work in this field by technical groups. • Ensure dissemination of data and information to all concerned. 	<ul style="list-style-type: none"> • Science & technology dept. • Local Urban Bodies • Secy. DM

Since early warning is not possible in case of earthquakes, the best choice is to ensure that seismicity is monitored and integrated with the GIS (Geographic Information Systems). It is necessary that mitigation strategies consider instrumentation of all seismic prone areas to have a total assessment of the seismic activity. This would enable reconfirmation and up-gradation of micro zonation activities. The government may consider setting up a technical team comprising scientists from time to time to investigate the aspects of instrumentation and prepare instrumentation plans for the state.

4.4.2. Non-Structural Measures

Task	Activities	Responsibility
Capacity Building	<ul style="list-style-type: none"> • Strengthening of Techno-legal regime • Organize trainings on earthquake resistant. • structures for engineers, architects, masons and others working in the construction industry. • Prepare departmental earthquake contingency plan, action plan and SOP (Standard Operating Procedures) • Incorporate earthquake engineering course in engineering syllabus. • Carry out structural safety audit of all critical infrastructures and key resources. • Motivate disaster insurance of buildings. 	<ul style="list-style-type: none"> • Education & technical Education Dept. • Revenue Dept. • SDMA • Line Dept. (Technical Knowledge) • YASHADA

4.5. Landslide

4.5.1. Major Mitigation Strategies

(i) Hazard Mapping: Hazard mapping will identify the landslide-prone locations and help to develop proper mitigation and preparedness measures in advance. The settlement plan will be appropriate to reduce the risk and make the resources more productive.

(ii) Land Use

- Areas with less vegetation on the upper slopes to be afforested with suitable plants and more attention to be paid to preserve the existing vegetation and forest patches.
- In landslides prone areas all development activities should be carried out only after proper planning and protective measures
- Natural drainage systems should be protected while making roads, canals, railway tracks, and other developmental works in landslide vulnerable areas.

- It should be mandatory not to develop settlements in landslide prone hill stations, sloppy areas, and newly constructed roadsides susceptible to landslide risk etc.
- In advance relocate the infrastructures and settlements in the risk zones.

(iii) Civil Engineering and other Mitigation Measures (Structural Measures)

In hilly areas retaining walls are important to stop the landslides from slipping. But other civil engineering structures such as shot-crafting, bolting, nailing, anchoring, bioengineering etc. As per the requirement of site-specific mitigation are also important measures. These are common and inevitable along the road sides in western-ghat region.

(iv) Engineered Structures

To control landslides, the strong engineering structures help a lot. Obviously, engineering structures with strong foundations can withstand or take the ground movement forces. Largely, the underground installations (pipes, cables etc.) should be made flexible to move to withstand forces caused by landslides.

(v) Surface drainage Control Works

The surface drainage control works are implemented to control the movement of landslides accompanied by infiltration of rainwater and spring flows.

(vi) Increasing Vegetation Cover

Vegetation controls soil erosion and landslides effectively. It is also one of the cheapest and widely accepted mitigation measures. The surface soil becomes stickier and stronger because of good vegetation. It helps to bind the top layer of the soil with layers below, while preventing excessive run-off and soil erosion

(vii) Insurance

The houses that are prone to landslides or any other natural disasters should be insured in time. In case of disaster, the houses may partly or fully get damaged, which is unbearable to any house owner. Thus, insurance is the best way to reconstruct the houses immediately after a disaster.

4.6. Cyclone

4.6.1. Structural Measures

Safe siting and safe construction in cyclones prone areas:

Task	Activities	Responsibility
Safe siting in cyclone prone areas	<ul style="list-style-type: none"> Identify cyclone susceptible areas. Avoid sea shores, hill slopes, river sides and weak and tall trees near house. Make provision for wide roads and drainage system 	<ul style="list-style-type: none"> SDMA Secy. R & R PWD Dept. Irrigation Dept
Safe construction	<ul style="list-style-type: none"> Incorporate cyclone resistant features in house design and construct accordingly 	

- Certain factors can make some sites more exposed than others.
- Coastal areas are particularly prone. Cyclones originate out at sea and become hazardous when they come ashore. They also drive the sea level up to cause coastal flooding.
- Estuaries and river deltas will flood during heavy rainfall associated with the
- Exposed sites on the tops of hills or cliff tops.
- Valley necks or open-ended valleys, through which winds may be channeled. When siting in areas that suffer from high winds:
- Select a sheltered site. Use any topographical effects or natural defenses that may protect the building or settlement from the prevailing wind.
- Consider the orientation of the site. Shelter behind hills from prevailing wind directions.
- Create wind breaks by planting trees or making strong bush fences. Settlements with many trees experience lower wind speeds.
- The layout of the building on the site can also influence the way winds affect them. Generally, settlements that are built in close clusters are known to suffer more damage than those that have reasonable spacing between buildings. Large buildings can be used to shelter smaller buildings.

A guide to safer layout would include:

- Site buildings are some distance from adjacent structures (at least three times the plan dimension of the building).
- Site buildings in staggered formations rather than straight lines.

- Keep buildings away from tall trees that might fall.
- Maximize street widths. Where possible they should be wider than 6m.
- In cyclone prone areas it is also important to minimize damage from floods, and landslides.
- Construction of cyclone shelter and development of infrastructures

Task	Activities	Responsibility
Development of physical infrastructures	<ul style="list-style-type: none"> • Constructions by NCRM Project • Construction of 13 multipurpose cyclone shelters in cyclone prone Konkan division • Strengthening of saline embankments (50 kms) • Development of underground cabling for electricity in Alibaug town • Construction of all-weather roads and bridges. • Construction of missing roads and bridges, strengthening/repairing of existing roads and bridges in cyclone belt. • Strengthening of dams and canals 	<ul style="list-style-type: none"> • SDMA • Secy. R & R • PWD Dept. • Irrigation Dept • Electricity Dept
Strengthening/Setting up of Early Warning system	<ul style="list-style-type: none"> • Set up cyclone and tsunami forecasting system. • Ensure timely dissemination of early warning to both on-shore and off-shore coastal people. • Ensure all ports, fishermen, salt workers are connected to warning dissemination system. 	<ul style="list-style-type: none"> • IMD, Mumbai • SDMA • Director, DMU • Tourism Dept

4.6.2. Non-Structural Measures

Task	Activities	Responsibility
Capacity Building Activities	<ul style="list-style-type: none"> • Prepare/update departmental cyclone contingency plan, action plan and SOP. • Organize cyclone mitigation and management trainings for various stakeholders involved 	<ul style="list-style-type: none"> • SDMA • YASHADA • Line Depts.

<p>Awareness Program</p>	<ul style="list-style-type: none"> • Organize awareness campaigns on cyclone/ tsunami safety in schools, colleges, and coastal communities. • Disseminate cyclone/tsunami warning to general public in coastal areas. 	<ul style="list-style-type: none"> • SDMA • Tourism Dept. • Information Dept.
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4.7. Fires

4.7.1. Structural Measures

Task	Activities	Responsibility
<p>Develop fire infrastructure and other fire facilities</p>	<ul style="list-style-type: none"> • Extend coverage of fire and emergency services to rural areas • Involve the new stakeholders. • Strengthen coordination between municipalities and industrial safety department. • Equip fire stations with modern fire engines and other equipment. • Provide fireproof devices to fire fighters. • Insurance coverage for fire staff • Make provision for special fire burn ward in the hospital • Ensure that all fire stations are connected to effective communication system 	<ul style="list-style-type: none"> • Fire and emergency services dept. • Industrial safety department • Urban Local Bodies • Health Dept

Fire and emergency services are essentially under the control of municipal authorities and hence, are discouraged from crossing the municipal limits. Industrial safety departments also have firefighting equipment for on-site emergencies. It is therefore seen that the rural sector by and large, is totally deprived of any firefighting assistance.

As a part of mitigation strategy, efforts should be made to -

- Make fire and emergency services available to rural areas outside the local municipal limits.
- Assisting municipal authorities not having fire brigade to establish such a service.
- Encourage agricultural marketing committees and cooperatives in rural areas to establish their fire services.
- Evolving methods of coordination between municipal fire services and industrial safety departments.
- Undertake community education and preparedness for fire fighting in areas where fire services will not easily available.
- In industrial towns, fire services should be equipped with protective clothing and firefighting devices including masks, gloves etc. for dealing with chemicals and toxic materials.
- Special burns wards should be established in every civil hospital and in the hospitals near the industrial estates.
- Equipping fire services with communication facilities like wireless etc. and wherever such facilities exist, these should be upgraded.
- A computerized data management system should be introduced to keep the record of all fires including frequency, extent, fatality, economic losses etc.
- The roles and responsibilities of district administration, police, fire services and medical services should be clearly laid down.

4.8. Industrial and Chemical Accidents

4.8.1. Structural Measures

Task	Activities	Responsibility
Industrial Safety Measures	<ul style="list-style-type: none"> • Set up Emergency Response Centre (ERC) • Strengthen Mutual Aid Response Group (MARG) • Form and strengthen the Crisis Groups at State, District and Local levels. • Industries not to be allowed in hazard prone areas. • Develop on-site and off-site Plans 	<ul style="list-style-type: none"> • Industry Dept. • MIDC • District Authorities • Local Authorities

	<ul style="list-style-type: none"> • Set up toxic water treatment facility • Set up leakage checkup devices • Purchase, store and keep functional all necessary industrial safety equipment. • Make provision for poison ward in civil hospital 	
Techno-legal Regime	<ul style="list-style-type: none"> • Implement the Acts and Rules related to industrial safety firmly. • Ensure structural safety inspection/audit 	<ul style="list-style-type: none"> • Industry Dept. • MIDC • Local
Strengthening EOC and warning systems	<ul style="list-style-type: none"> • Establish/strengthen EOCs (Emergency Operations Centers) at all levels. • Set up onsite and off-site warning dissemination system 	<ul style="list-style-type: none"> • Nodal Authority • MIDC • Dist. Collector • Municipal Commissioner

- Disaster prone areas should not allow for any factory/industry. Consider the land use planning in view of hazard, risk, and vulnerability of the State.
- All industrial concentrations should be encouraged to establish MARG for management of industrial accidents.
- Industries involved in the production or transportation of inflammable, hazardous and toxic materials should have a mandatory responsibility for preparing an off-site plan and communicating the same to the District Collector. Simulation exercises should be undertaken in the adjoining communities.
- Poison centers should be established in every civil hospital and in the hospitals near the industrial estates with facilities for detoxication.
- All transport of hazardous and toxic materials should be communicated to the RTO.
- All pipelines carrying hazardous and toxic materials should be equipped with devices to check any leakage or metal fatigue.
- Small scale industries releasing toxic wastewater should be encouraged to set up common effluent treatment facilities.
- A familiar format for chemical data sheets should be devised which should be used by DISH to collect information from all industries in the state and the

same should be available with the fire brigade & police.

4.8.2. Non- Structural Measures

Task	Activities	Responsibility
Emergency Planning	<ul style="list-style-type: none"> • Prepare/update emergency onsite and offsite plan • Regular monitoring of safety activities in all the factories/ industries 	<ul style="list-style-type: none"> • Nodal Authority: MIDC • Dist. Collector • Municipal Commissioner
Organize Capacity Building	<ul style="list-style-type: none"> • Organize industrial safety training for officers and staff working in the factories. • Set up an on-site and off-site monitoring team to check all safety measures. • Conduct mock drills in a regular interval. • Encourage disaster insurance 	<ul style="list-style-type: none"> • Nodal Authority: MIDC • Dist. Collector • Municipal Commissioner
Awareness Activities	<ul style="list-style-type: none"> • Organize community awareness programs for the communities residing near the factories and let people know what to do what not to do in case of industrial disaster. • Develop IEC materials on local language and distribute them in schools and local communities. • Organize school level awareness activities and ensure students' participation in large numbers. 	<ul style="list-style-type: none"> • Nodal Authority: MIDC • Dist. Collector • Municipal Commissioner • SDMA

The district administration shall also organize various training and awareness programs for community awareness for first aid and mitigation.

CHAPTER 5: DISASTER PREPAREDNESS

5.1. Introduction

Disaster Preparedness

Preparedness for any disaster makes the response situation effective. A well-prepared society can meet any emergency better. Thus, government on preventive and mitigation measures rather than relief and post disaster works has given more priority. The following disaster management activities may be considered under preparedness measures.

- Update the resource inventory
- Review and update the DM plans
- Develop DM policy, guideline, and plan
- Establishment of EOC and early warning system
- Formation of DM committees and task forces
- Organize capacity building trainings
- Purchase/repair the search and rescue materials and critical supplies
- Identify disaster prone areas and complete the HRVA study
- Prepare the hazard maps
- Organize community-based DM trainings, orientations, and awareness activities
- Make fund provision for disaster response, mitigation and relief works
- Implement all preventive and mitigation activities in disaster prone areas
- Conduct mock drills
- Mainstreaming of DM in development programs/projects/scheme
- Develop coordination and net working with various stakeholders

5.2. Capacity Building Trainings

The following capacity building training courses are to be organized under disaster management program in the State for various state holders

Task	Activity	Responsibility
Capacity Building Trainings	<ul style="list-style-type: none"> • Training to civil Defence, Police and • Home Guards personnels, NSS/NC students in Search and Rescue (SAR), and various aspect of disaster management 	<ul style="list-style-type: none"> • SDMA/DDMA • Civil Defense • Police • Home Guard • Education Dept.

	<ul style="list-style-type: none"> • Training to teachers, municipal corporation staff, district administration personnel, Zilla Parishad staff, in various aspect of disaster management 	<ul style="list-style-type: none"> • Education Dept. • DDMA • Municipal Corp. • Zilla Parishad • YASHADA
	<ul style="list-style-type: none"> • Training to civil society, Community Based Organizations (CBOs), Self-Help Groups (SHGs) members, community volunteers, PRI members and corporate entities in various aspect of disaster management 	<ul style="list-style-type: none"> • SDMA/DDMA • Municipal Corp. • YASHADA
	<ul style="list-style-type: none"> • Training to fire and emergency service personal, and traffic police in various aspect of disaster management 	<ul style="list-style-type: none"> • SDMA • Municipal Corporation • Fire/Police
	<ul style="list-style-type: none"> • Training to State Disaster Response Force (SDRF) Teams in various aspect of disaster management 	<ul style="list-style-type: none"> • SDMA
	<ul style="list-style-type: none"> • Training to Government officers and media persons in various aspect of disaster management 	<ul style="list-style-type: none"> • SDMA • Information Dept. • YASHADA
	<ul style="list-style-type: none"> • Training to engineers, architects, structural engineers, builders, and masons in various aspect of disaster management • Training city planners and government officials to promote ecosystem-based adaptation and integration of climate risk management in developmental planning. 	<ul style="list-style-type: none"> • SDMA • UD Dept. • PWD Dept. • YASHADA

<p>Develop database for disaster management</p>	<ul style="list-style-type: none"> • Conduct HRVA study in the State and prepare hazard-wise mapping. • Develop Geographic Information System (GIS) based information on emergency fire and ambulance services, important civil supply, medical and health services, and important emergency resources. • For disaster management purpose SDMA will develop a database including information of contact details, disaster resources, response agencies, NGOs, trained personnel, most vulnerable groups, evacuation routes, available shelters, relief centers, critical infrastructures, storage godowns, etc. 	<ul style="list-style-type: none"> • SDMA • Science & Tech. Dept. • All line Dept. • MRSAC
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5.3. Techno-Legal Regime

Task	Activity	Responsibility
<p>Institutional Arrangement</p>	<ul style="list-style-type: none"> • Constitution of State Disaster Management Authority 	<ul style="list-style-type: none"> • R & R Dept.
	<ul style="list-style-type: none"> • Formation of DM policy, guidelines, and Act. • Development of DM Plans at state, district, taluka, and village level including HRVA • Prepare Hazard-wise Action Plans 	<ul style="list-style-type: none"> • SDMA • All line Depts.
	<ul style="list-style-type: none"> • State Contingency Plans • Prepare SOPs and ESF • Departmental Disaster Management Plans 	

<ul style="list-style-type: none"> • Formulation of professional Civil Engineers Act. • Revision of General Development Control Regulations (GDCR) • Emergency Medical Service Act • Formation of an Emergency Medical Services (EMS) • Set up paramedic cadre through training programs and accredit / license them. • Provide trainings to emergency service staff. • Make provisions for reorganization and setting up of trauma centres in the state • Standardize and license ambulance services. • Dedicate a statewide medical emergency toll free number. • Develop of guidelines/schemes for Emergency Care of special section of people like children, elders, Below Poverty Line (BPL) beneficiaries, citizens of remote and disaster-prone areas. 	<ul style="list-style-type: none"> • UD Dept. • Legal dept. • Health & Medical Dept.
<ul style="list-style-type: none"> • Ensure all safety measures • Identification of locations. • Put reliable alarm system in place • Arrangement of personnel protective equipment. • Promotion of life saving methods and techniques 	<ul style="list-style-type: none"> • Home Dept. • Science & Technology Dept. • Revenue Dept. • SDMA • Line Dept

<ul style="list-style-type: none"> • Strengthening of relief distribution and accounting system at state and district level • Identification of centralized system for receipt, storage, and distribution of relief • Rate contract, procurement, and stockpile of relief material 	<ul style="list-style-type: none"> • Revenue Dept. Secy. R & R • Dist. Collector • Municipal Commissioner • Civil Supply Dept.
<ul style="list-style-type: none"> • Strengthening of EOC at state, and district level • Retrofitting of existing buildings in hazard prone Zones • Strengthening the DM committees, Task Forces, training organizations, government line agencies. • Establish the EOCs with latest communication system right from state to village level • Organize mock drills on different themes and check the preparedness of line agencies • Ensure the emergency logistics arrangement is in place system right from state to village level • Organize mock drills on different themes and check the preparedness of line agencies • Ensure the emergency logistics arrangement is in place 	<ul style="list-style-type: none"> • Revenue & DM Dept. • Secy. R & R • Dist. Collector • Municipal Commissioner • SDMA

5.4. Awareness

Task	Activity	Responsibility
Information education and communication	<ul style="list-style-type: none"> • Design and develop public awareness messages in local language. • Disseminate the messages through electronic and print media. • Do wall paintings, hoardings, posters, booklets, leaflets, street plays, folk dances, local cable, Advertisement, hording, booklets, school programs etc. as core awareness activities. • Disseminate messages on promoting plantation and green spaces in urban areas 	<ul style="list-style-type: none"> • Revenue Dept. • Information Dept. • Education Dept. • All line dept. • Dist. Collectors • Municipal Commissioners • Other Dist. Authorities • Forest Department

5.5. Medical Preparedness

(a) Nodal Authority

The Director of Health Services is the State control authority for Disaster management in the state. The Joint Director of Health Services (Malaria, Filariasis & Waterborne Diseases) is the State Nodal officer for Disaster Management. At district level, the Civil Surgeon is Nodal Officer for the same.

The health department is supposed to refer to the Hospital Safety Guidelines for further details issued by the National Disaster Management authority.

<https://ndma.gov.in/images/guidelines/Guidelines-Hospital-Safety.pdf>

5.6. Communication System

Task	Activity	Responsibility
Set up safe communication and last mile Connectivity	<ul style="list-style-type: none"> • Set up reliable communication system between state, district, taluka, and village. • undertake research on the latest emergency communication and information system. • Enhance the local communication mechanism and give priority on local language to • Disseminate the alert message. • Form the Early Warning Teams at village level and train them on EWS. Ensure the teams are ready with communication equipment round the clock. • Ensure the most reliable and alternative EWS in Disaster prone localities. 	<ul style="list-style-type: none"> • Revenue Dept. • SDMA • Science & Technology Dept. • Information Dept. • Local and district authorities • Municipal Commissioner

CHAPTER 6: DISASTER RESPONSE

6.1. Response Strategy

A coordinated response mechanism makes relief and rescue operation effective, resulting in minimizing losses of lives, property and environment damage. The goal of response strategy is obvious to make maximum efforts to save more lives during disaster and use the limited available resource in proper planning in due coordination with all line departments at the time of emergency.

Disaster relief is a coordinated multi-agency response to reduce the impact of a disaster and its long-term results. Relief activities include rescue, relocation, providing food and water, preventing disease and disability, repairing vital services such as telecommunications and transport, providing temporary shelter and emergency health care.

The operational priorities regarding response strategy are strongly outlined as follows:

- Dissemination of accurate and timely emergency public information and warnings to the public
- Law enforcement
- Intelligence gathering/situation analysis
- Resource allocation and coordination
- Fire and rescue
- Evacuation
- Medical care
- Coroner operations
- Care and shelter
- Access and perimeter control
- Public health
- Safety assessment
- Restoration of vital services and utilities
- Along with goal and operational priorities, the operational strategy of response mechanism is also important at State level which includes,
 - Responsive and focused
 - well-functioning
 - working together effectively
 - proper use of resources

6.2. Institutional Arrangements

To respond to disasters, the State Disaster Management Plan allows all disaster specific mechanisms to work together at the time of emergency. For this purpose, the existing administrative set, up at State level needs to be defined and made

more specific and operational in terms of emergency management. The Incident Response System (IRS) which has been taken as an effective disaster management system and customized in Indian context considering the administrative establishment proposes Chief Secretary as the head supported by the Secretary of Disaster Management Unit (DMU) at State level and district collectors at district level with Emergency Operation Centers (EOC).

6.3. Alert Mechanism

6.3.1. Early Warning

It is marked that the early warning message of a disaster declared by its concerned competent agency first through electronic media and print media. Based on such early warning or report from district collector on occurrence of a disaster the State disaster response mechanism will be activated and kept on standby position to respond to the situation on priority basis.

The details of competent agencies' work on early warning are given below:

Table 5: Competent agencies working on early warnings

Disaster	Competent Agencies
Earthquake	IMD, ISR
Floods	Water Resource Dept. Irrigation Dept. IMD
Cyclones	IMD
Tsunami	INCOIS, ISR, IMD
Drought	Agriculture Department
Epidemics and heat waves	Health and Family Welfare Dept.
Industrial and Chemical Accidents	Industry, Director Industrial Safety and Health
Fire	Fire and Emergency Services

6.3.2. Early Warning Dissemination System

On occurrence of a disaster in the State the message will be communicated immediately to the concerned authorities and agencies at State and National level.

6.3.2.1. At State Level

Governor, Chief Minister, Home Minister, State Cabinet, Guardian Minister of the district, and non-officials of the affected district namely MLAs and MPs.

6.3.2.2. At National Level

PMO, Cabinet Secretary, Secretary Home, and defense, NDMA and MHA to respond to disasters, the State Disaster Management Plan allows all disaster specific

mechanisms to work together at the time of emergency. For this purpose, the existing administrative set, up at State level needs to be defined and made more specific and operational in terms of emergency management. The Incident Response System (IRS) which has been taken as an effective disaster management system and customized in Indian context considering the administrative establishment proposes Chief Secretary as the head supported by the Secretary of Disaster Management Unit (DMU) at State level and district collectors at district level with Emergency Operation Centres (EOC).

Based on the early warning of cyclone disaster of the IMD and other competent agencies the same warning must be circulated to fishermen through ports, fisheries officials and AIR broadcasts daily three/four times in local language. The warning related to fishermen includes the following information - synoptic situation, signals hoisted and advice not to go out into the sea. The warning is generally issued for fishermen when one of the following conditions of weather is expected along and off any coast.

- Strong offshore and on shore winds speed exceeding 45 km (about 27.96 mi)/hr.
- Squally weather – frequent squalls with rain, or persistent type of strong gusty winds (36 km (about 22.37 mi)/hr.) accompanied by rain
- Gales and State of sea very rough or above (wave heights are four meters or more)

6.4. Salt Workers

The salt workers in coastal districts will be protected from cyclone disasters. On receipt of cyclone warning the district collectors of coastal area will immediately warn the salt industries to investigate the situation and take care of the salt workers for timely evacuation and safe shelter. In this connection the district collector will involve the officials of the Labor Department and Industry Department.

6.4.1. Ship in the high sea

To help the ships in the high sea the IMD Mumbai published alert bulletins. It issues bulletins known as “Extra,” “Storm” and “Special” as and when required during cyclone.

6.4.2. Coastal shipping

The ships roaming in coastal area up to 75 km (about 46.6 mi) far from coastline are provided the regular weather information through weather bulletins, The CWC Ahmedabad issues these routine bulletins twice a day and broadcasted by Coastal

Radio Stations – Mumbai and Kandla. During the cyclone situation bulletin known as “Extra,” “Storm” and “Special” are issued as and when necessary, by the CWC, Ahmedabad six times a day and broadcasted by Coastal Radio Stations at Mumbai and Kandla.

6.4.3. Mass Rescue Operation at Sea

The state of Maharashtra has coastline of 720 kms. and Maritime zone around Maharashtra has great potential risk areas due to the threat posed by transportation of Oil and hazardous chemical substances. The Indian Coast Guard is the lead agency primarily entrusted to respond to operation at sea in events of any sighting of distress or incidence at sea. One of the statutory duties of the Department of Disaster Management, Relief and Rehabilitation is to facilitate Mass Rescue Operation at sea at the time of major fatalities at sea in coordination with the Indian Coast Guard and all departments of State and Central Government. The State Mass Rescue Operation Contingency Plan (Short Title: MRO, MAH) prepared by the Indian Coast Guard has been designed to provide simple and operationally flexible mass rescue contingency plan to effectively respond to all major distress situations at sea in the Search and Rescue Region (SRR) of Maharashtra. The MRO (MAH) manual has been vetted by the Department of DM, R&R. All public and private resources under the India Disaster Resource Network (IDRN) are included as part of the plan¹. The detailed Local Contingency Plan for Mass Rescue Operation at Sea prepared by the Indian Coast Guard is annexed to this SDMP. The MRO covers important aspects of coordinated mass rescue operation including the scope, AoR, rescue procedures, documentation, training, and media interaction.

As per the MRO, the Department of DM R&R is entrusted with following responsibilities in events of an emergency:

- a) Crisis Management in case of Mass Rescue Operation at sea i.e. arrange for rescue, relief.
- b) Arrange for Risk Management by coordinating among all concerned departments of the State and Central Government & promoting the culture of Preparedness, Mitigation and Prevention for reducing disaster risks in the sea and coastal area.
- c) Preparation of State Disaster Management Plan and Mass Rescue Operation Contingency Plan at Sea.
- d) Promoting the culture of preparedness, mitigation & prevention of effecting sustainable development.

e) Coordinating with Nodal Departments of the State Government for preparation of Crisis Management Plan¹ in respect of those disasters, which are monitored by the National Crisis Management Group.

6.5. Public

The weather-related information available by AIR in local language. Now the updated weather bulletins are also immediately circulated by electronic and print media. In case of cyclone warning the special bulletins are broadcasted by local radio and television for public information and preparedness.

6.6. Flood

IMD, Mumbai issues heavy rainfall forecast and warning. The Water Resources Department, Govt. of Maharashtra manages the floods. On receiving heavy rainfall warning the Water Resource Department assesses the situation and issues flood warning if necessary and keeps alert the nodal officers of every irrigation division and control rooms of district administration and police. The Krishna and Bhima Sub-division office, Pune has prepared its flood control plan. In every irrigation division, the executive engineer is a nodal officer who will closely monitor the water level and discharge of dams and rainfall during emergencies.

6.7. Tsunami

A state-of-the art early warning center is established at INCOIS with all the necessary computational and communication infrastructure that enables reception of real time data from all the sensors, analysis of the data, generation and dissemination of tsunami advisories following a standard operating procedure.

Seismic and sea level data are continuously monitored in the early warning centre using a custom-built software application that generates alarms/alerts in the warning centre whenever a pre-set threshold is crossed.

Tsunami warnings/watches are then generated based on pre-set decision support rules and disseminated to the concerned authorities for action, following a Standard Operating Procedure.

The National Institute of Ocean Technology (NIOT) has installed 2 Bottom Pressure Recorders (BPRs) deep in the Arabian Sea to confirm the triggering of a tsunami.

¹ Local Contingency Plan for Mass Rescue Operations (MRO) at Sea for Maharashtra.

6.7.1. Dissemination

The National Early Warning Centre will generate and disseminate timely advisories to the Control Room of the Ministry of Home Affairs for further dissemination to the public. For the dissemination of alerts to MHA a satellite based virtual private network for disaster management support has been established. This network enables early warning center to disseminate warnings to the MHA, as well as to the State Emergency Operation Centre.

On receiving an initial warning at SEOC, immediately the same will be sent to all line departments, the district administration who are likely to be affected by reliable communication means.

6.8. Drought

A prolonged period of abnormally low rainfall, leading to a shortage of water, causes drought. It severely affects the agriculture and economy of the State. Being a slow disaster, it takes time to get declared by the government considering the rainfall reports of the IMD. The drought situation in Maharashtra was generally monitored from the progress of the onset and the withdrawal of the Southwest monsoon. The agriculture department of the government of Maharashtra is the authentic agency to declare it. Drought situation reports are released by Agriculture department from time to time. The IMD issues the rainfall report in this regard through AIR, Doordarshan and other print and electronic media.

6.9. Earthquake

Early warning on earthquake disaster is not predictable. On account of disaster history, the people of earthquake prone areas are motivated to take up all possible structural and non-structural activities. As it is known that earthquake does not kill, but the unsafe structures do. People shall be encouraged to build safe structures. In case of earthquake, preparedness, and migration measures play a key role. To minimize the loss of lives from earthquake disaster only quick response activities are to be taken up.

Human-induced Disasters

Prediction of occurrence of unnatural disasters is not possible. So, preparedness and mitigation measures are required to put in place and start immediate response to such disasters if they happen somewhere in the State. Chemical, biological, radiological, and nuclear disasters need to be handled by trained people working in police, health, and industry departments. So, CBRN related issues need professional groups to organize awareness activities at State and district level.

6.10. Disaster Response Management at State Level

6.10.1. Disaster Response Management through Incident Response System (IRS)

With early warning or without it, if a disaster occurs either natural or unnatural then response activities start. In this phase search and rescue operations begin on a priority basis. Based on location, size and severity of disaster the search and rescue operation have to be planned and implemented. Obviously, it is a multi-disciplinary job so different stakeholders get involved. Due to lack of prior coordination and absence of role clarity among various stakeholders the disaster specific relief and rescue operation gets delayed. To avoid all these disorders, the NDMA has given priority to adapting the **Incident Response System** in handling the emergency operation situation. However, Maharashtra State Disaster Management Authority has customized the IRS considering its administrative set up and will be implemented.

The Detailed description of the IRS is available in the National Disaster Management Authority's Guideline for implementation of Incident Response system (IRS).

<https://ndma.gov.in/images/guidelines/incidentresponsesystemjuly.pdf>

6.10.2. Coordination with Armed Forces, Para Military Forces, Railway and Airport Authorities

Immediately after a disaster the district administration will start its response works with its own available resources. If the situation goes beyond its control, then district administration seeks support from State and National level. In this emergency State Government coordinates with Armed forces, Paramilitary forces, Airport Authorities of India, Indian Railways and other organizations for search and rescue operation, relief management and temporary shelter arrangement for affected people.

The National Disaster Response Force (NDRF) located at Talegaon, Pune covers the Maharashtra State, and it plays an energetic role in response and relief operations. This battalion is well equipped with skilled workforce and equipment and ready to respond to any disaster in the State. The Maharashtra government will take its support as and when necessary. In normal time the NDRF helps the disaster-prone districts in organizing capacity building trainings for various stake holders and in emergency it reaches at the spot to response on demand of the district/state. The district administration may directly contact the NDRF or go through the Chief Secretary and Secretary of Disaster Management Unit.

In extreme situations support of the Armed forces requires at that time the Chief Secretary will have to ask the national authorities for help.

As it is said in Response Mechanism chapter that the SDMA will adapt the IRS in its emergency response operation. If necessary, the State will take help from NDRF, Para Military Forces and Armed Forces in the time of emergency for search and rescue operations, relief, and rehabilitation purposes. To make the operation work easier and effective the representative of NDRF, Armed Forces and Paramilitary Forces may be appointed as the Operation Section Chief (OSC). Under his leadership the Search and Rescue operations will be carried out. The role and responsibilities of OSC, Strike Team or Task Force Leader are given details in Response Mechanism chapter.

6.10.3. Involvement of NGOs, NSS/NCC, and Local Communities

In emergency response activities voluntary organizations play a vital role. They get involved in search and rescue operations, first aid service, food and shelter management, and relief works. Thus, the local communities, college NSS/NCC students, community-based organizations, NGOs and INGOs will be involved in emergency activities to help the disaster affected people and the response personnel.

6.10.4. Temporary Shelter, Health, and Sanitation

Immediately after the disaster the search and rescue works get started on war footing basis, the rescued persons and affected families need to have temporary shelters with basic amenities. The shelter management teams must take all necessary steps to arrange temporary shelters in affected locations with toilets, drinking water, light, food, and security. The problems of women, children, elderly people and disable persons must be taken care of. The victim families would be provided candles, matches, water pouches, milk pockets, biscuits, potable gas stoves, first aid kits, and clothes.

6.10.5. Maintenance of Essential Services

Disaster causes great damage to the infrastructures and disturbs the normal movement of society. The basic essential services like electricity, water supply, communication, road links, and gas connection etc. need immediate attention of the administration to get restored. The departments concerned, with the help of other supporting agencies, must come forward and start working on a priority basis.

6.10.6. Law and Order

In emergency situations the affected people and administration get busy in search and rescue operations and try to save the lives of maximum people. In such a situation security needs to be stringent and police must have a close look into the behaviors of criminals. People during disaster become hopeless and do not have time and patience to take care of their properties. Thus, police must maintain law and order in disaster-affected areas with great care and ensure that people's belongings are safe.

6.10.7. Communication

Every stakeholder in an emergency needs to be informed about the progress and constraints of response work. The govt. bodies, affected communities, media persons and voluntary organizations work together during emergency so district administration will have to set a communication desk to circulate the updated information to all and based on field information the State will also do same. Media management is important to control panic in the community and make the response activities more effective, systematic, and fair. Through communication unit the authentic information goes to media and let people to know what the measures govt. are is taking up, where and how the work is going on, what is the span of search and rescue operation and how community will get involved in this phase. Only effective communication helps the affected people to stay connected with govt. connected and know government welfare schemes, relief measures, and financial support.

6.10.8. Preliminary Damage Assessment

In the aftermath of a disaster the affected families and areas need assistance from the government on a priority basis. But it is difficult to meet the demands without proper damage assessment. In this regard the government departments and local authorities shall carry out a preliminary need and loss assessment study under the guidance of district administration and distribute the available resources accordingly in affected areas. The loss and damage assessment report helps to deploy the limited resources properly without chaos. The district administration for this purpose shall develop some parameters, resulting in the affected people and infrastructure being restored in time.

CHAPTER 7: DISASTER-WISE ACTION PLAN

7.1. Flood

Flood is a temporary inundation of large regions as the result of an increase in water level of a reservoir or river and high winds, cyclones, storm-surge along coast, tsunami, melting snow or dam bursts. Maharashtra is highly vulnerable to floods. Also, floods are not just restricted to one region but spread all over the state. Maharashtra, therefore, exhibits a high proneness to floods. Floods in Maharashtra occur during monsoon and hence, the accompanying damage such as deaths due to lightning, landslides, house crashes and drowning have been commonly reported from most districts. Analyzing the floods in Maharashtra, one observes that most floods in Maharashtra are flash floods due to nallah-overflows and poor drainage systems. Very few floods, like the one in Konkan in 2983, are due to heavy rains in the region. The floods of 2005 and 2006 have shown that almost all the districts in the State are vulnerable to floods. All districts in the State except Ahmednagar, Beed, Solapur, Latur, Osmanabad, Jalna, Aurangabad, and Buldhana are flood prone. This puts most of the population in the State vulnerable to floods.

Onset Type

Floods may happen gradually and take hours, or can even happen suddenly due to breach of the structures, spillover etc. A heavy downpour causes flash floods in the region.

Disaster Declaration

IMD, Mumbai and Nagpur predict heavy rainfall warning for Maharashtra state. Based on the information, and assessing the rainfall of catchment area, water level of rivers and dams the water resource department declares flood disaster for affected areas in the state.

Early Warning

Community based flood forecasting and warning systems

It is important that the people in each community receive information as early as possible about the possibility of flooding in their area. The way in which messages are disseminated in communities will depend on local conditions, but may include some or all of the following:

- Media warnings (print and electronic)
- General warning indicators, for example sirens
- Warnings delivered to areas by community leaders or emergency services.

- Dedicated automatic telephone warnings to at-risk properties.
- Information about flooding and flood conditions in communities upstream. One approach to disseminating messages is to pass warning messages from village to village as the flood moves downstream.
- Keep watch and be regularly informed about the river level and embankment conditions in the local area. The monitoring of the river and embankment should be increased as the water level increases and crosses the critical danger level
- A community-based warning system to pass any information about an approaching flood to every family.

Involvement of communities in data collection and local flood warning systems

If communities become involved in data collection for flood forecasting, and the importance of their role is understood, a sense of ownership is developed. Individuals can be appointed for the following tasks:

Taking care of installations/ equipment, trained as gauge readers for manual instruments (rain gauges, water level recorders), Radio operators to report real-time observations.

Trained individuals within the community should be able to gather and update information to:

- Know the depth of past severe floods in the local area.
- Know the causes of flooding in the local area.
- Know how quickly the waters might rise.
- Know how long the floodwaters might remain in the locality.
- Know the direction of movement of the floodwaters.
- Involving community members also helps prevent vandalism and damage to installations going unreported.

Procedure for disseminating warnings to remote areas

Communities in remote areas may not receive the types of warnings described in the previous section. Responsibilities need to be defined clearly for lower tiers of administration and the emergency services to have predefined links with communities in remote areas. This should include:

- Local radio, which should be supplied with clear and accurate information.
- Use of appointed community wardens with direct two-way radio or mobile telephone access to warning agencies and emergency authorities

- Local means of raising alarms, for example church bells, sirens, loud hailers, loudspeakers etc. The latter could be the responsibility of selected individuals or wardens, who need to be provided with equipment and transport, for example motorcycles or bicycles.
- High Priority Telegram
- Doordarshan and the local cable channels (TV channels & radio Channels including FM radio)
- Bulletins in the Press
- Satellite Based Disaster Warning Systems
- Fax, Telephone

Trigger Mechanism: Plan Activation

The flood response system will be activated on the occurrence of heavy rain. The Secretary of R & R will activate all the Departments for emergency response including the State EOC, other control rooms at the state level as well as district control rooms with full strength. He will issue instructions to include the following details:

- Specify exact resources required.
- The type of assistance to be provided.
- The time limit within which assistance is needed.
- The state, district, or other contact persons/agencies for the provision of the assistance
- Other Task Forces with which coordination should take place.

Once the situation is totally controlled and normalcy is restored, the Secretary R & R declares End of Emergency Response and issues instructions to withdraw the staff deployed in emergency duties.

#	Response to be taken	Responsibility
1	<p>Flood Alert and Warning and Preparation</p> <ul style="list-style-type: none"> • Receive rain fall warning from IMD website. • Communicate the warning to State authorities, all district collectors, and other stakeholders. • Ensure control rooms are in a readiness position at all levels. • Keep the workforce, equipment and critical supplies on standby position • Make provision for immediate evacuation of affected people to safer places. • Ensure food, water etc. are sufficiently arranged in affected areas. • Ensure all affected people will be evacuated in time and provided basic facilities in temporary shelters 	<p>State Emergency Operation Centre (SEOC) Secretary R & R Director, DMU</p>
2	<p>Flood Declaration</p> <ul style="list-style-type: none"> • Based on rainfall monitored by various agencies like IMD, CWC rainfall stations, State Irrigation Department, Central Water Commission and Agriculture Department the State Water Resource Department declares flood in affected areas. • Report on the occurrence of flood to Secy. R & R, MSDMA, Heads of line departments, Chief Secretary and Chief Minister's office and National Disaster Management EOC, Gol. 	<p>State Emergency Operation Centre (SEOC) and Water Resources Dept.</p>
3	<p>Arrange Alternative Emergency Communication</p> <ul style="list-style-type: none"> • Establish communication links by alternate communication equipment like phone, radio etc. in state/district EOC and Taluka control rooms. • Deployment of Mobile Emergency Communication Units to affected areas for establishing communication links 	<p>State Emergency Operation Centre (SEOC)</p>

4	<p>Emergency Meeting and Response Measures</p> <ul style="list-style-type: none"> • Hold first meeting with Duty Officers of EOC • Contact the Heads of all the line departments to reach State EOC • Contact the district collector/s and take the emergency requirement report. • Dispatch of Search & Rescue teams to the affected areas. • Report to the Chief Secretary on the situation. • Contact the NDRF team if situation worsens • Make arrangements for the aerial survey of affected areas 	Secretary R & R
5	<p>Search and Rescue Operation</p> <ul style="list-style-type: none"> • Deploy search and rescue teams in affected area • Rescue and shift people to safer places. • Maintain law and order in affected areas. • Ensure medical treatment of flood victims 	Secy. R & R Secy. Home Secy. Health
6	<p>Post Flood Situation</p> <ul style="list-style-type: none"> • Prepare damage assessment report. • Ensure proper collection and distribution of relief materials. • Prepare the list of missing people, death, and injured persons. • Take necessary steps for carcass management. • Restore and repair the basic infrastructures. • Develop reconstruction and rehabilitation plan 	Revenue. Agriculture, management, Health, Municipal Corporations

Department-wise relief works:

#	Response to be taken	Responsibility
1	Providing temporary shelters to evacuated persons	PWD, Revenue Dept.
2	Providing food materials to the victims Providing fodder and animal feeds	Revenue, Civil Supplies Animal Husbandry

3	Providing safe drinking water to the victims	Water Supply Dept.
4	Provision of hygienic sanitation facilities	Health Dept., NGO, Community groups
5	Provision of health assistance	Health Dept.
6	Clothing and utensils	Civil Supplies
7	Relief camps	PWD, Revenue Dept.
8	Providing transport services to shelter sites	Revenue Dept. Transport Dept.

Relief Measures

Short-term relief measures

- Provide dry rations for home cooking.
- Supply clean and safe water for drinking, cooking and personal hygiene.
- Supply adequate of medicines, disinfectants, fumigants etc. to check outbreak of epidemics.
- Distribute sufficient clothing materials, cooking and eating utensils. Provide sufficient covered space for shelter. Disaster-affected households shall be provided with necessary tools, equipment and materials for repair, reconstruction, and maintenance for safe use of their shelter.
- Relief camps also provide good temporary arrangements for people affected by the flood. Adequate numbers of buildings or open space should be identified where relief camps can be set up during emergencies.

Interim Relief Measures

- Arrangements to be made for quick identification and maintenance of the records of disposal of dead bodies in the affected areas (Home Dept., Revenue Dept., Health Dept., and Local Authorities).
- Arrangements to be made to record the complaints of all persons reported missing. Follow-up action in terms of verification of the report also needs to be taken. (Home Dept.)
- District Magistrates and sub-divisional magistrates are to be empowered to exempt the requirement of identification and post-mortem in case of mass casualties. Revenue Dept may depute additional sub-divisional magistrates to expedite disposal of the dead bodies. (Revenue & Home Dept.)
- Unclaimed/unidentified dead bodies to be disposed of with the help of pre identified voluntary Agencies at the earliest after keeping their records. (Home Dept., Revenue Dept., Health Dept. & Local Bodies)
- Additional workforce to be deployed in the affected areas to supplement local administration efforts. (GAD).

- Separate Cell to be established at state/district/taluka level to coordinate with the NGOs and outside donor/aid agencies. (Revenue Dept.)
- Regular meetings of the different stakeholders/departments should be organized at state level for sharing information, developing strategies for relief operations. (Secy. R & R, Director DMU & Collectors at District Level).
- Information & Public Relation Department to coordinate with the media to play a positive role in disseminating appropriate information to the public and the government to facilitate the speedy recovery.

Assessment of Damage/Loss and Relief needs

- The Secy. R & R to issue instructions to the district collectors to provide the Need Assessment Report. The Secy. R & R should consolidate the same and to prepare “State’s Need Assessment Report.”
- The Secy. R & R to issue instructions to the District Collectors to provide the Damage and Loss Assessment Report. The Secy. R & R to consolidate the same and to prepare the State’s Damage and Loss Assessment Report which will be useful in planning and implementing the relief operations for disaster victims.
- Adequate workforce, vehicles, stationery etc. should be provided to supplement the efforts for need/loss assessment. (Secretary of R & R Dept.)
- The relief need assessment report should be provided by the Collectors. (Secy. R & R, Director DMU & Collectors)
- Identification and demolition of dangerous structures in the affected areas to minimize further loss of life and injuries. (PWD Dept., Revenue Dept., and Local Bodies)
- Arrangements for distribution of gratuitous relief and cash doles. (Revenue Dept., Panchayat & Rural Housing Dept., UD Dept. and Collectors) (*Sorce: SDMP Gujrat*)

7.2. Drought

Drought is a natural hazard that differs from other hazards since it has a slow onset, evolves over months or even years, affects a large spatial extent, and causes little structural damage. It is a creeping disaster.

It has broken the backbone of the farmers in Vidarbha or Marathwada regions in Maharashtra. Since 2012, farmers in two regions have been severely affected. Falling rainfall levels, falling ground water levels, drying wells, rivers and reservoirs and poor agricultural production warn the onset of drought. According to Indian Meteorological Department, the country is said to be drought affected when the overall rainfall deficiency is more than 10 per cent of the extended period average.

Onset Type and Warning

Its onset and end and severity are often difficult to decide. Droughts are a normal part of climate variability for virtually all regions, it is important to develop plans to deal with these extended periods of water shortage in a prompt, systematic manner as they evolve. Experience has shown that the democratic form of governance has handled droughts more efficiently than others, as showed by the situation in India before and after independence. Like other hazards, the impacts of drought span economic, environmental, and social sectors and can be reduced through mitigation and preparedness.

Authority

The Department of Agriculture of Government of Maharashtra is the nodal agency in the State to declare a situation as drought disaster considering all the parameters mandated by the Drought Manual 2016, Government of India.

Drought Type

There are three kinds of drought: meteorological drought, hydrological and agricultural drought. (*Source: threeissues.sdsu.edu*)

- 1. Meteorological drought** is related to shortage of rainfall. It occurs when the seasonal rainfall received over an area is less than 25% of its long-term average value. It is called moderate if the deficiency in rainfall is in the range of 26-50%. It is called severe when the deficit exceeds 50% of the normal.
- 2. Hydrological drought** is caused due to deficiencies in surface and sub-surface water supplies. Such a situation may arise irrespective of average or above average rainfall. For, it is caused by indiscreet usage of water by an ignorant and careless population.
- 3. Agricultural drought** is caused by the combination of meteorological and hydrological droughts. It occurs when soil moisture and rainfall are both inadequate during the crop-growing season. For, water demand of crops depends on the prevailing weather conditions, biological characteristics of the specific crop, its stage and rate of growth and the physical and biological properties of the soil where crop plantation happens to be. Thus, agricultural drought is caused by a combination of heterogeneous factors by chances together— meteorological, hydrological, plant, weather, and soil. Besides, agricultural drought is also caused due to excessive sensitivity of agriculture to seasonal cropping with a weekly rainfall. Deficiency of even 5 cm (about 1.97 in) from mid-May to mid-October (the Kharif season) may cause drought. Poorly drained soil with mineral deficiency needs constant watering before the monsoon and after the monsoon. In fact, during sowing kharif and rabi crops, soil must be kept sufficiently moist by watering, or the yield is adversely affected.

Typical Effects of Drought

Drought is a creeping disaster. Its onset is difficult to demarcate and so also its end. Delay in the arrival of monsoon, failure of monsoon, irregular and scanty rainfall during kharif, falling of groundwater level, drying of wells and reservoirs and deficit in paddy plantation show the onset of drought. Its impacts are generally non-structural and difficult to quantify at once. Its spatial extent like that of floods denotes its severity. The fall in groundwater level, less food production, availability of less fodder for animals, migration of laborers, water crisis finds its long-term impact. Its impacts like those of floods are cumulative and its continuance over a period or season magnifies the impact manifold.

Drought, unlike other hazards, does not cause any structural damage. The typical effects include loss of crops, livestock, timber, fishery production, food shortage, dehydration, loss of life, increased poverty etc. In fact, the impacts of drought are categorized as economic, environmental, and social. (*Source: threeissues.sdsu.edu*)

1. Economic impacts

- Loss of production in farm sector and in non-farm sectors
- Loss of income and buying power of people in drought affected areas.
- Loss of production in agro-processing industries
- Unemployment increases
- Loss of government revenue etc.

2. Environmental impacts

- Loss of flora and fauna
- Loss of forest cover and vegetation
- Migration and extinction of wildlife due to more preying by starving people
- Loss of biodiversity due to continuous drought
- Water sources will dry up.

3. Social impacts

- Population migration to urban will be higher
- Unemployment, child labor, human trafficking increase
- Social conflict for drinking water
- Problem of law and order
- School dropout increases
- People sales out their valuables in cheap rate

Roles and Responsibilities of Government Departments

Department of Disaster Management

- Drought being slow on-setting hazard, response to it may be coupled with mitigation measures to hold it from further intensification.
- Encourage the Water Resources Department, Department of Minor Irrigation, Department of Agriculture, and other specialized agencies to take up drought prevention and mitigation measures.
- To coordinate with Urban Development Department/Panchayati Raj Department/ Rural Development Department/PWD/ Education Department/Health Department etc. for promotion of rainwater harvesting measures as a drought prevention measure and encourage them.
- To incorporate rain harvesting measures in all building construction works undertaken by the State Government.
- Work out drought prevention, mitigation, and preparedness measures in association with the Department of Agriculture, Rural Development Department and Department of Environment and Forest & through other specialized agencies.

Department of Agriculture

- Identification of drought prone areas through GIS mapping, rainfall estimation etc.
- Survey and study of identified drought prone areas
- Formulation of prevention, mitigation, and preparedness measures along with budget allocation,
- Formulation of policy and strategizing the implementation of rain harvesting program & activities
- Working out Crop Contingency Plan
- Providing Agriculture Input subsidy
- Strategizing the storage and supply of seeds, fertilizers, and pesticides
- Working out ecological betterment of the organizing the irrigation facilities
- Working out alternative cropping program and activities

Department of Minor Irrigation

- Identify drought-prone areas, availability of water resources, and level of ground water in the area.
- Formulation of prevention, mitigation, and preparedness measures.
- Strategizing the cropping pattern in association with the department of Agriculture and Creation of Irrigation facilities accordingly.
- Monitoring and supervision of the watershed and rainwater harvesting facilities in drought prone areas.

Department of Water Resources

In association with the Department of Minor Irrigation, integrate its preventive & mitigation measures with those of Department of Agriculture for prevention, mitigation, and preparedness for drought.

Department of food and Consumer Protection

In consultation with the Department of Disaster Management, set up centers for supply of food grains on subsidized rates or free, as decided.

Department of Health and Family Planning

- Organize medical camps in affected areas.
- Checklist of medicines and medical facilities to have in the camps.
- Arrangements for the running of the camps on long term
- Arrangement of provisions for the medical staff staffing the camps
- Making arrangements for community centered medical services rather than camp centered services.

Department of Public Health

- Installation of extra hand pumps to sustain the supply of drinking water.
- Formulating rain harvesting practices and promoting the same in vulnerable areas.

Relief Measures

- Ensure immediate supply of drinking water, food grains, and fodder.
- Supply all necessary medicines and supplements for children, women, and other poor communities.
- Distribute preventive animal health inputs for the time bound overcoming of disease challenges.
- Provide off-farming business support to needy families.
- Sustenance funds to victim families for children education, health and purchasing daily needs.
- Government takes effective steps to control the market price of basic goods rice, wheat, pulses, edible oil etc.
- Ensure all government welfare schemes, projects and programs are implemented properly in the drought prone areas.
- Make sure that agricultural products provided by the government are reaching the target beneficiaries without discrimination and administrative chaos.
- Strengthening local natural resource management
- Promoting conflict resolution mechanisms

7.3. Earthquake

Earthquakes in Maharashtra show major alignment along the west coast and Western Ghats region. Seismic activity can be observed near Ratnagiri, along the western coast, Koyna Nagar, Bhatsa and Surya areas of Thane district. Latur earthquake in Maharashtra occurred on Sept. 30, 1993, of 6.3 magnitude and caused a huge loss of lives and properties.

Onset Type and Warning

Earthquake is a sudden onset hazard. They occur at any time of year, day, or night, with sudden impact and without any warning sign. There is no accepted method of earthquake prediction as on date.

Disaster Declaration

Based on the information on occurrence of earthquake in certain areas from local authority/ district collector the SDMA declares earthquake disaster affected areas.

Trigger Mechanism: Plan Activation

- An earthquake of magnitude 5 or more is likely to cause deaths and injuries to human beings and damage to all kinds of property, both private and public. Unfortunately, there is truly little warning available before the earthquake. Therefore, planning should cater for a quick response at all levels to reduce the effects of the earthquake to a minimum. The Revenue department of the State will be the nodal department for formulating, controlling, monitoring and directing measures for earthquake preparedness, organizing rescue, relief, and rehabilitation. All other concerned departments should extend full cooperation in all matters pertaining to the management of earthquake disasters whenever it occurs. The occurrence of an earthquake may be reported by the Indian Meteorological Department (IMD) / National Geophysical Research Institute (NGRI) / Institute of Seismological Research (ISR) to the State Authority by the fastest means.
- The State Crisis Management Committee (SCMC) under the chair of the Chief Secretary should be activated immediately on the occurrence of any major earthquake. Besides these, the SEOC also receives reports on the earthquake from district and taluka levels. On receipt of the information, the SEOC verifies the authenticity of the reports and will inform the real situation to the concerned authorities. The State government may, by notification published in the official gazette and in any one or more newspapers having widest circulation in the area, declare such area to be disaster affected area.

Response Mechanism

Information and reporting

The agencies who provide information to the SEOC about the occurrence of an earthquake in the State are as stated below:

- Indian Meteorological Department (IMD), Mumbai
- Institute of Seismological Research (ISR)
- Mobilize additional workforce from the departments to the affected district / talukas for supporting the Relief Operation. They should be provided task force action Plans of the concerned talukas / district prepared earlier.

Management of Media (Press/TV Channels/Government Press Notes) to be carried out by the Secretary (Information & Broadcasting) with special emphasis on rumor control. He shall maintain constant liaison with Principal Secretary of Relief Rehabilitation.

Restoration of lines of communications and essential services to facilitate emergency response.

- Establishment of Emergency Communication
- Restoration of Communication Links (Rail, Road & Air)
- Restoration of power and electricity
- Supply of safe drinking water
- Restoration of essential lifeline infrastructure

Search, rescue, and medical assistance

- Identification of areas where SAR Teams to be deployed
- Coordination of SAR teams for their quick deployment in allotted areas
- Provision of quick transport of SAR teams to affected areas.
- The department of Transport to evolve a mechanism for clearing access routes and debris in order to facilitate search and rescue operations.
- Mobilization of specialized equipment and machinery to affected areas.
- Cordoning of affected areas with control of entry and exit.
- Traffic Management by establishment of traffic points and check-posts.
- The Home Department to evolve a mechanism for providing security of properties of government and public in the affected areas.
- Setting up of field hospitals in the affected areas and deployment of mobile hospitals.
- Arrangements to be made for quick transportation of injured victims to the hospitals.
- Secretary (Health) to evolve a mechanism for speedy treatment of casualties.

Emergency relief (shelter, food, clothing, etc.)

- a. Establishment of temporary shelters for evacuees.
- b. Ensuring provision of essential services as under:
 - Arrangement for food, clothing, blanket/bedding, drinking water, sanitation and hygiene, lighting arrangements and essential medicines.
 - Deployment of mobile hospitals in affected areas for treatment of victims.
 - Providing counseling services to the earthquake victims and their relatives.
- c. Arrangement for providing transport facility to send dead bodies of non-locals to their natives. The administration should also ensure Law and Order during shifting of the dead bodies.
- d. Ensure establishment of communication link between the affected people and their relatives outside.

Emergency Response Phase (First 72 Hours of the Incident)

#	Task	Responsibilities
1	<p>Occurrence of Earthquake and Information Dissemination</p> <ul style="list-style-type: none"> • Verify the authenticity of the incident from agencies like IMD, ISR, and also from District / Taluka control rooms, Police and Fire Brigade control rooms • Report the occurrence of earthquake to Director DMU, Secretary R & R, CEO - SDMA, Heads of all line departments, Chief Secretary and Chief Minister's Office and National Disaster Management EOC at MHA, GoI • In case of L-2 level event, overall management of SEOC shall be taken over by Secretary R & R 	Dy. Secretary (SEOC)
2	<p>Emergency Communication</p> <ul style="list-style-type: none"> • Establish communication link by activating alternate communication equipment i.e., satellite phone, HF / VHF set, HAM Radio, VSAT etc. in State / District EOCs and Taluka control rooms. • Instruct to deploy the Mobile Emergency Communication Units to affected areas for establishing communication link 	Dy. Secretary (SEOC) Duty officer (I & P)

<p>3</p>	<p>Holding Emergency Meeting</p> <ul style="list-style-type: none"> • Hold first meeting with Heads of all line departments and inform them to send responsible officers to SEOC. • Alert Emergency Rescue Teams for quick mobilization to affected areas • Inform GAD to ensure all State Government employees report for emergency duties within half an hour. • Senior State level officers to be deputed to the affected areas. • Contact Ministry of Defense for aerial / satellite imageries of the affected areas 	<p>Secretary R & R</p>
<p>4</p>	<p>Deployment of Task Forces</p> <ul style="list-style-type: none"> • Dispatch of Search & Rescue teams with equipment and materials to the affected areas • Quick Medical Response Teams to the affected areas • Request for the services of NDRF and Armed forces, if required through designated representative • Activate Operations Section of IRS for Emergency Response Operation • Instruct both regular and emergency staff of EOC to report for duty. • Instruct Quick Assessment Task Force to submit preliminary need and loss assessment report of the affected areas. • Make arrangements for an aerial survey of the affected areas. • Instruct local administration to evacuate victims to safer sites. 	<p>Secretary R & R, Secretary Health, Collector, Municipal Corporation</p>

<p>5</p>	<p>Meeting with Crisis Management Group</p> <ul style="list-style-type: none"> • Contact Chief Secretary to decide on time and venue for holding Crisis Management Group (CMG) meeting at the earliest. • Inform all CMG members to attend CMG meeting in designated venue to assess situation and review emergency measures. • Crisis Management Group to assess situation, delegate responsibilities for organizing rescue and relief operations 	<p>Secretary R & R,</p>
<p>6</p>	<p>Interdepartmental Coordination</p> <ul style="list-style-type: none"> • Requests may be made for assistance from the Central Government (MHA and MOD), if required. Request the nearest headquarters of the Armed Forces to render assistance in emergency search, rescue, and relief operations • Inform Secretaries of the departments to provide necessary logistics support to emergency operation task forces • Assess the conditions of road, rail, and air communication link for quick mobilization of Emergency Teams and resources to affected areas and take follow up actions. • Director, Information and Secretary - (I & P) to establish media management / information cell for public information, guidance, and rumor control • Make suitable transportation arrangement for mobilization of quick response teams to the affected areas • Maintain constant touch with the National / District and Taluka EOCs 	<p>Chair, SEC, Secretary R & R, Secretary Transport, Secretary (I & P)</p>

<p>7</p>	<p>Assistance from External agencies</p> <ul style="list-style-type: none"> • Contact private / public sector agencies in the State to assist in emergency rescue and relief operations. • If necessary, assistance may be asked from neighboring states and outside agencies. • Set up separate desks for each operation task force and NGO coordination desk in the SEOC for coordinating emergency operations • Set up separate desks for each operation task force and NGO coordination desk in the SEOC for coordinating emergency operations 	<p>Chief Secretary, Secretary R & R, Director DMU</p>
<p>8</p>	<p>Maintain Law and Order</p> <ul style="list-style-type: none"> • Provide security in affected areas and maintain law and order situation. • Instruct to cordon affected areas and setting up of check posts to control entry and exit. • Free access routes and manage traffic for mobilization of equipment, machinery, and volunteers to the affected areas. • Ensure safety and security of personnel deputed in affected areas for emergency response operation 	<p>Secretary Home</p>
<p>9</p>	<p>Media Management</p> <ul style="list-style-type: none"> • Instruct district information officers to establish information center near affected areas to provide guidance to volunteers and aid agencies. • Establish Press / Media Centre for media management and information dissemination • Arrange for press / media release for rumor control and public information and guidance. • Establish information centres at the arrival and departure points especially at the airports, railway stations and interstate bus terminus • Prepare and circulate the situation report and prepare press notes twice a day 	<p>Chief Secretary R & R, Secretary I & P</p>

10	<p>Treatment of Injured persons</p> <ul style="list-style-type: none"> Alert all major hospitals to make necessary arrangement for treatment of injured Set up field hospitals near the affected areas & arrange to shift injured persons to field hospitals 	Director, Disaster Management Unit
11	<p>Relief Materials</p> <ul style="list-style-type: none"> Establish relief coordination center at the airport, railway station, etc. for arrival of Search & Rescue and Medical Teams coming for humanitarian aid. Establish central relief coordination center nearer to State Head Quarters Mobilize relief materials i.e., tents, food materials, water, essential medicines, blankets, etc. to the affected districts and talukas. Instruct district collectors to establish relief coordination center and godowns near affected areas and provide full security cover as well. Arrange for distribution of cash doles to the victims 	Secretary I & P and Secretary R & R, Secretary Transport, Secretary Civil Supplies, Collectors, Municipalities
12	<p>Temporary Shelters</p> <p>Arrange to shift evacuated persons to temporary shelters and ensure provision of food, water facilities, blankets, and storage of relief materials</p>	Secretary R & R Collector/s
13	<p>Restoration of Essential Services</p> <p>Restore essential services i.e., power, water supply, telecommunication facilities of SEOC, headquarter, AIR, Doordarshan, Governor, Chief Minister, senior officials of the State bureaucracy on priority basis</p>	PWD, BSNL, Water Supply, Electricity, AIR, Doordarshan
14	<p>Transportation</p> <p>Arrange road, rail, and air transport at State / District headquarters for dispatch of relief materials to the affected areas</p>	Secretary Transport
15	<p>Damage Assessment</p> <ul style="list-style-type: none"> Prepare quick need assessment report for planning of relief operation and mobilization of resources to the affected areas. Conduct aerial survey and also mobilize quick assessment teams to affected areas. 	Secretary R & R Collector/s

16	<p>Set up Public Grievance Desk</p> <ul style="list-style-type: none"> • Arrange information centers at shelter sites for maintaining records of victims and to provide guidance to relatives, NGOs, etc. • Arrange for complaints regarding missing persons and initiate search in shelters, hospitals, and police records 	Director DMU, Collector,
17	<p>Disposal of Dead Bodies</p> <ul style="list-style-type: none"> • Arrange for identification, photograph, postmortem and maintenance of records for disposal of dead bodies. • Arrange for Sub-Divisional Magistrates empowerment for waiving off postmortem of dead bodies. • Arrange for additional workforce if necessary for disposal of dead bodies. • Arrange for transportation of dead bodies to their native places if so required. • Arrange for disposal of unidentified and unclaimed dead bodies • Arrange for transportation of injured from field hospitals to base hospitals 	Secretary Home, Secretary Health, Secretary Transport, Collector

Relief Measures

Short-Term Relief Measures

- 1) Provide temporary shelter to affected people
- 2) Evacuation sites should be safe, and easily accessible.
- 3) Continue to provide essential services to the affected people i.e., food, water, clothing, sanitation, and medical assistance

The Secretary R & R, and Director DM Unit to ensure the following in the relief camps:

- Special emphasis on hygiene and sanitation aspects should be given in relief camp sites.
- A separate area should be earmarked within the relief camp for storage of relief materials.
- Adequate workforce and transport facilities for the camp site.
- Arrangements to be made for trauma management.
- Mobile medical units to be sent to remote areas with a view to provide medical assistance to the victims/injured.
- The information center should be established by the administration.

Interim Relief Measures

- Arrangements to be made for identification and maintenance of the records of disposal of dead bodies in the affected areas.
- Arrangements to be made to record the complaints of all persons reported missing. Follow-up action in verification of the report also needs to be taken.
- Sub-divisional magistrates to be empowered to exempt the requirement of post-mortem in case of mass casualties. The Revenue Dept may depute additional SDMs to expedite disposal of the dead bodies.
- Unclaimed/unidentified dead bodies to be disposed of at the earliest after keeping their records.
- Additional human resources are needed in the affected areas to supplement local administration efforts.
- Separate Cell to be established at state/district/taluka level to coordinate with the NGOs and outside donor/aid agencies.
- Regular meetings of the different stakeholders/departments should be organized at state level for sharing of information, developing strategies for relief operations.
- Information & Broadcasting Dept to coordinate with the media to play a positive role in disseminating appropriate information to public and the government in order to facilitate the speedy recovery.

Assessment of Damage / Loss and Relief needs

- The Secretary R & R and Director DMU issue instructions to the district collectors to provide the need and loss assessment report.
- provide manpower, vehicles, etc. to supplement the efforts for need/loss assessment.
- Identification and demolition of dangerous structures in the affected areas to minimize further loss of life and injuries.
- Arrangements for debris removal and its appropriate disposal.
- Arrangements for distribution of gratuitous relief and cash doles.
- Arrangements to be made for survey of human loss and distribution of ex gratia relief to the families of deceased persons.
- Teams to be formed and dispatched to the affected areas for detailed assessment of houses and property assessment.
- As reconstruction of houses will take a prolonged period, arrangements to be made to provide interim shelters to the affected.
- Identification of the site for interim shelter

- Allocation of areas to the affected families
- Providing essential services at the interim shelter sites such as water, power, drainage / sanitation, PDS shops, etc.
- Distribution of shelter materials to individual families (*Source: SDMP Gujrat*)

7.4. Cyclone

A violent storm often of vast extent, characterized by high winds rotating about a calm center of low atmospheric pressure. This center moves onward, often with a velocity of 50 km (about 31.07 mi) an hour. The coastal areas are risk prone to cyclones. Maharashtra has a coastal belt of over 720 kilometers (about 447.39 mi) between Gujarat to Goa. Thus, the Konkan region including Mumbai becomes prone to cyclones. There are 386 marine fishing villages / hamlets with 17,918 boats engaged in fishing in this coastal belt. Cyclones make impact by killing people, damaging property, crops, and infrastructure. Mumbai has faced peripheral impact in 1976, 1982, 1988 and October 1996, and has been hit on two occasions by cyclones (1948 and June 1996). The data indicates that the city is prone to cyclones. The most recent hit the State was cyclone Phyan in 2009, which affected the state's coastal districts.

The IMD has bifurcated the Very Severe Cyclonic Storm category for the Maximum Sustained Wind (MSW) speed of 118-221 kmph into two subcategories as Very Severe Cyclone Storm for the MSW 118-166 kmph and Extremely Severe Cyclone Storm for the MSW 167-221 kmph.

Onset Type and Warning

India Meteorological department (IMD), government of India is responsible for monitoring of formation of cyclone, its intensity and movement. On assessing the situation that the cyclone is likely to cross Indian coast then IMD issues the cyclone alert/warning. IMD follows four stages cyclone-warning system and communicates to all concerned stakeholders including NDMA, SDMA and district authorities.

1) Pre-Cyclone Watch

It is issued when a depression forms over the Bay of Bengal irrespective of its distance from the coast and is likely to affect Indian coast in future. The pre-cyclone watch is issued by the name of Director General of Meteorology and at least 72 hours (about 3 days) before adverse weather begins. It is issued at least once a day.

2) Cyclone Alert

It is issued at least 48 hours (about 2 days) before the bad weather begins when the cyclone is beyond 500 Km from the coast. It is held every three hours.

3) Cyclone Warning

It is issued at least 24 hours before the commencement of the bad weather when the cyclone is located within 500 Km from the coast. Information about time /place of landfall is indicated in the bulletin. Confidence in estimation increases as the cyclone comes closer to the coast.

4) Post landfall outlook

It is issued 12 hours before the cyclone landfall, when the cyclone is located within 200 Km from the coast. More accurate & specific information about time /place of landfall and associated severe weather indicated in the bulletin. In addition, the interior distraction is likely to be affected due to the cyclone warned of in this bulletin.

India Meteorological department recently have divided very sever cyclonic storm into two parts namely very severe cyclone and extremely severe cyclones.

Disaster Declaration

On receiving information from IMD the SDMA declares the affected districts as cyclone disaster hit areas.

Trigger Mechanism: Plan Activation

On the receipt of cyclone warning issued by the Indian Meteorological Department (IMD) SDMA will activate its Response Action Plan (RAP) & will issue instructions to include the following details:

- Specify exact resources (in terms of workforce, equipment, and essential items from key dept. /stakeholders) required.
- The type of assistance to be provided.
- The time limit within which assistance is needed.
- Details of other Task/Response Forces through which coordination should take place

The State EOC, and other control rooms at the state level as well as district control rooms should be activated with full strength immediately. The state Government may publish a notification in the official gazette, declaring such area to be disaster-affected area.

Once the situation is totally controlled and normalcy is restored, the SDMA declares End of Emergency Response and issues instructions to withdraw the staff deployed in emergency duties.

Roles and Responsibilities

Task	Activities	Responsibility
<p>Receipt and dissemination of cyclone warning</p>	<p>Report the generation of Cyclone in Arabian Sea/ Indian Ocean after getting information from IMD to following officials:</p> <ul style="list-style-type: none"> • Secretary R & R • Principal Secretary (Revenue) • Chief Secretary of the State • Members of Crisis Management Group • Hon. Chief Minister • Hon. Minister – Revenue • National Disaster Management Authority, Gol. • All concerned District Collectors • Control Rooms of the district/s likely to be affected as per preliminary warning of IMD. • Ministers and Secretaries of all line departments • Instruct all Collectors (of the districts likely to be affected) to activate the District Control Room at full strength. • Alert all response teams in the State for deployment. • Remain in constant touch with control rooms at National & State Level. • Instruct and alert all heads of departments of the key line departments to activate their departmental plan and SOPs for Cyclone response. 	<p>IMD, Secy. R & R</p>
<p>Establishment of departmental coordination</p>	<ul style="list-style-type: none"> • Instruct all State government officers and employees in the State to report to their respective Head for emergency duties (Only if the warning is of a level 2 disaster or as per the decision taken in the meeting of the Crisis Management Group headed by Chief Secretary). • Alert the District Collectors of districts not likely to be affected to be prepared for providing: 	<p>Secy. R & R, General Administration Dept.,</p>

	<ul style="list-style-type: none"> ○ Additional workforce. ○ Additional resources ○ Machinery & equipment ○ Relief material to the districts likely to be affected 	
Activation of communication system	<ul style="list-style-type: none"> ● Activate alternative communication equipment i.e., satellite phones, HF/VHF sets, Ham radio, VSAT in State EOC, District and Taluka control rooms. ● Establish communication links with EOCs and Search & Rescue Teams in all Municipal Corporations and alert them to be in stage of readiness. ● Establish communication links with villages likely to be affected. 	Secy. R & R
Organize situation review meeting and issue instructions and orders	<ul style="list-style-type: none"> ● Establish contact with IMD, CWC, ACWC, ISRO and the defense ministry of Gol for aerial / satellites imageries of the latest Cyclone threat. ● Get the latest weather report from IMD/other international Web Sites to know the exact location of Cyclone and the likely area where landfall will take place. ● After reviewing the weather report and satellite images issue instructions and orders for emergency response to areas likely to be affected. 	Secy. R & R
Management of EOC and communication system	<ul style="list-style-type: none"> ● Take over full command of the State EOC. ● Instruct line departments to depute representatives at the State and District EOCs. ● Hold a meeting with leaders of task forces and entrust them with their tasks. ● Ensure that Cyclone information is disseminated to all who are at danger. ● Arrange emergency meetings with State Crisis Management Group (SCG) to devise a plan of 	Revenue/DM

	<p>action</p> <ul style="list-style-type: none"> • Arrange dissemination of information through various means of communication such as Radio, TV, Cable Network, SMS about Cyclone warning to districts/areas which are likely to be hit by Cyclonic Storm. 	<p>Director DMU</p>
<p>Response preparedness (Areas likely to be affected)</p>	<ul style="list-style-type: none"> • Based on the warning issued by IMD, pinpoint the districts and villages likely to be affected by Cyclone and start the procedure for identifying safe places/ shelters for evacuation in those villages. • Collectors/Village level officers should be contacted to know the status of the shelters with the capacity of the shelter and other available facilities at the site. • Make transport arrangements for mobilization of all emergency response teams. 	<p>Revenue Dept., Transport</p> <p>Dept. and Dist. Collectors, Municipal Commissioner</p>
	<ul style="list-style-type: none"> • Alert following teams to remain in readiness: <ul style="list-style-type: none"> ○ Evacuation. ○ Emergency Medical Services ○ Search and Rescue ○ Alert following emergency response forces to remain in readiness: <ul style="list-style-type: none"> ○ Fire & Emergency Services ○ NDRF /SDRF ○ Village Disaster Management Teams ○ Police, Home Guards 	<p>Director DMU</p>
	<ul style="list-style-type: none"> • Dissemination of information to the vulnerable areas • All preparedness measures to be taken by various authorities • Keep in touch with National, District and Taluka Control Rooms • Release information at appropriate time to media and public regarding response measures organized by the Government 	<p>Secretary R & R, information Dept</p>

Emergency evacuation and relief management	<ul style="list-style-type: none"> If reports regarding striking of Cyclone are confirmed by IMD and other sources, start the emergency response and relief operations will start. 	Secretary R & R
	<ul style="list-style-type: none"> Divert the emergency services to areas likely to be affected as per the warning issued by IMD. 	Director DMU, Dist. Collector
	<ul style="list-style-type: none"> Inform the public residing in areas likely to be affected to evacuate through various means such as SMS, AIR, FM Radio, Doordarshan, etc. Start evacuation from the likely affected areas through Police support, if necessary 	Secretary R & R, Dist. Collector, Municipal Commissioner, Home Dept.
	<ul style="list-style-type: none"> To account for the exact number of fishermen in the sea and fishermen that have already reached the shore 	Maharashtra Maritime Board/ Coast Guard / Fishery
	<ul style="list-style-type: none"> Ensure that the Relief Management work planned in the areas likely to be affected by the Cyclone is well organized. 	R& R Dept.
	<ul style="list-style-type: none"> Ensure that the arrangement for basic amenities (shown below) at evacuation/relief centres are made by the respective departments: <ul style="list-style-type: none"> Drinking water Food Clothing Sanitation and hygiene, Lighting Medicines and other Health Care 	Secretary R & R, Civil Supply Dept., Revenue Dept. & Dist. Collectors, Municipal Commissioner Water Supply Dept., Health Dept.
	<ul style="list-style-type: none"> Inform following agencies to be in a state of readiness for assisting in the Cyclone response measures (if required): <ul style="list-style-type: none"> Public sector agencies Private sector agencies NGOs CBOs Volunteer Organizations 	Secretary R & R
	<ul style="list-style-type: none"> Request for help (if needed) to MHA/National Disaster Management Authority 	Secretary R & R

	<ul style="list-style-type: none"> • Make necessary arrangements for public information/guidance, public opinion, and rumor control. 	Information Dept.
	<ul style="list-style-type: none"> • Restriction may be imposed for transportation in threatened areas. 	Transport Dept. and Dist. Collector, Municipal Commissioner
Disaster declaration	<ul style="list-style-type: none"> • When a Cyclone makes a landfall, the Cyclone affected Dist. Collectors should send a communication to the State Govt. to declare the area as disaster affected as necessary, (depending upon the nature and intensity of impact) 	District Collector
Preliminary damage assessment, deployment of emergency response teams and information dissemination	<ul style="list-style-type: none"> • Dist. Collector/s should send teams to the affected areas to take care of the effects of Cyclone and associated rain. • District Collector/s should send sector wise situation reports to: State EOC/SDMA 	Dist. Collector, Municipal Commissioner
	<ul style="list-style-type: none"> • Deployment of following teams to Cyclone affected areas: <ul style="list-style-type: none"> ○ Emergency Communication Teams ○ Emergency Medical Services Teams ○ Search and Rescue Teams (With Equipment) ○ Preliminary damage Assessment Teams ○ Need Assessment Teams 	Secretary R & R, Dist. Collector, Municipal Commissioner
	<ul style="list-style-type: none"> • Establish communication links with affected districts by activating alternate communication equipment such as Satellite Phones, HF/VHF Sets, Ham Radio, V Set etc., in State/District EOCs and Taluka Control Rooms. • Arrange dissemination of information about occurrence of Cyclone and areas that are affected by it to Media & Public. 	Director DMU, Dist. Collector, Information Dept.
Mobilization and deployment of task forces	<ul style="list-style-type: none"> • Remain in constant touch with IMD for updates on weather forecast for the coming hours and plan accordingly. 	Secretary R & R, Dist. Collector, Municipal Commissioner, Key line Dept.

	<ul style="list-style-type: none"> • Immediate mobilization of following units/teams to areas affected by Cyclone and associated rains. <ul style="list-style-type: none"> ○ S & R Teams of Fire and Emergency Services ○ Quick Medical Response Teams ○ Quick Damage & Loss Assessment Teams ○ Quick Need Assessment Teams ○ Teams for disposal of dead bodies ○ Teams for disposal of carcasses ○ Teams for debris clearance (if any) ○ Teams for maintaining Law & Order in the affected areas ○ Arrange for S & R teams of Air Force (If required). 	
<p>Quick Response Measures</p>	<ul style="list-style-type: none"> • State EOC, and the Collectors of the affected District/s should ensure that the following response activities are carried out immediately: • Clearance of access roads • To survey the access roads/routes leading to the affected areas and manage traffic for mobilization of equipment, machinery, and volunteers. • Identify alternate roads/routes for evacuation. • Undertake repairing/restoration of damaged roads leading to the affected areas. • Identify and declare unsafe buildings/structures in Cyclone affected areas. 	<p>Secretary R & R, Dist. Collectors, Municipal Commissioner Line Dept.</p>
	<ul style="list-style-type: none"> • Evacuate people from unsafe buildings/structures and shift them to relief camps/sites. • Divert/stop transport activities (Rail + Road) heading towards Cyclone affected areas. 	<p>PWD Dept., Transport Dept., Railways,</p>

	<ul style="list-style-type: none"> • Arrangement of basic facilities at relief centres • To ensure that necessary arrangements at evacuation/relief centers are made with sufficient availability of food, water, blankets/clothing, medicines, lighting, sanitation, and hygiene etc. • To ensure necessary security arrangements for the personals (Emergency responders/relief teams) who are working at Relief Centers and involved in distribution of Relief Materials. • To ensure that law and order is kept at evacuation/relief centers and in the affected areas. 	<p>Revenue Dept., Civil Supply Dept., Collectors, Municipal Commissioner, Water Supply Dept., Health Dept., Power & Energy Dept., Electricity Dept.& Local Authorities, Home Dept.</p>
	<ul style="list-style-type: none"> • Safety of fishermen and salt workers • Immediate actions to be taken for safety of • fishermen, salt workers and visitors at Cyclone affected coastal areas. • Ensure that all the fishermen and salt workers have returned from the sea or those who are in the sea are rescued and evacuated to safer places. 	<p>Secretary R & R, Port and</p> <p>Fisheries Dept., Tourism Dept., Industrial Dept.</p>
	<p>Control of outbreak of diseases</p> <ul style="list-style-type: none"> • To establish camp hospitals near the affected areas. • To make transportation arrangements to shift • seriously injured persons to nearest Camp Hospitals, Taluka and District Hospitals, Regional and State Hospitals • Ensure that the Hospitals are well prepared to deal with seriously injured persons. • To ensure that the required medical assistance/ aid and medicines are provided to the affected. • people at site as well as at evacuation/relief centers in the affected area and necessary 	<p>Health Dept., Transport Dept.</p>

	<p>records are maintained.</p> <ul style="list-style-type: none"> • Take sanitation and epidemic control measures for preventing any water borne disease. • Keep adequate stock of essential medicines, first aid etc. at taluka/district hospitals. • Take steps to purify drinking water sources • Take the help of doctors/paramedics from the list of doctors/paramedics available at the taluka/district level for medical assistance. 	
	<p>Other important measures</p> <ul style="list-style-type: none"> • Prepare quick need assessment report for planning of relief operation. • Additional assistance may be asked for emergency response/relief from Gol-NDMA (If needed). • Prepare situation report and circulate it twice a day in the morning and evening to key Government functionaries. • Maintain constant touch with National, District and Taluka EOCs and other control rooms. 	Revenue Department, Relief and Rehabilitation
	<ul style="list-style-type: none"> • Remain in constant touch with IMD for updates on weather forecast for the coming days and plan accordingly. • Conduct Aerial survey of affected areas for taking a stalk of the situation. • Activate evacuation & relief centers according to needs/situation. • Maintain record of persons admitted at evacuation/ relief centers. 	
Review of situation and reporting	<ul style="list-style-type: none"> • Establish contact with IMD, CWC, ACWC, ISRO and the defense ministry of Gol for aerial / satellites imageries about further weather condition and plan accordingly. 	

<p>Restoration of critical infrastructure/essential services</p>	<ul style="list-style-type: none"> • Ensure that the essential services/critical infrastructure of the affected areas have been restored or alternative arrangements are made for ensuring safety of people and smooth management of emergency response. • Ensure that key administrative and lifeline buildings are brought back to operation quickly. • Designate and deploy senior officers (as per the need) to worst affected area/s to oversee rescue/ relief operation. • Ensure following primary necessities are restored power, water, telecommunication, roads, and bridges 	
<p>Disposal of dead bodies</p>	<ul style="list-style-type: none"> • Ensure following procedure is followed before disposal/handing over of dead bodies: Photographs of the dead bodies are taken, Identification of the dead bodies is done, • Postmortem wherever necessary and possible is carried out, • Handing over dead bodies of persons known/ identified to their relatives, • Disposal of unclaimed and unidentified dead bodies. 	
	<ul style="list-style-type: none"> • Animal Husbandry Department to ensure medical aid to cattle who are injured. • Disposal of animal carcasses with the help of local bodies/health dept. 	
<p>Public information and media management</p>	<ul style="list-style-type: none"> • Establish Media/Press Centre for media management and information dissemination. • Ensure that the information about the progress of rescue and relief is given to media/public at least twice a day. • Establish help lines for facilitating communication between the victims and their 	<p>Director DMU, Information Dept., Dist. Collector, Municipal Commissioner</p>

	<p>relatives residing outside the affected area/s.</p> <ul style="list-style-type: none"> Establish Information Centers at strategic locations for providing information about persons evacuated to the relief centers/hospitals. 	
	<ul style="list-style-type: none"> Ensure that the information to media/general public about the response of the State Government is released in an organized manner. Organize media briefing twice a day at pre-determined intervals. 	
<p>Miscellaneous rescue and relief work</p>	<ul style="list-style-type: none"> Assess the situation and take appropriate action to accelerate the Search & Rescue Operations. Depute additional officers and supporting staff to Cyclone affected areas from non-affected areas (if required) to accelerate the rescue and relief operations. 	<p>Director DMU, Districts Collector, Municipal Commissioner</p>
	<ul style="list-style-type: none"> Ensure that the relief assistance received from outside is centrally received, stored, and sent for distribution to Cyclone affected areas according to their need and proper accounts are maintained about both receipt and distribution. 	<p>Secy. R & R, Civil Supply Dept.</p>
	<ul style="list-style-type: none"> District Collector may oversee the functioning of relief centers and ensure adequate supply of relief materials. 	<p>Revenue Dept, Civil Supply Dept.,</p>
	<ul style="list-style-type: none"> Remain in constant touch with IMD for updates on weather forecast for the coming days and plan accordingly. Arrange for procurement of additional relief material required for relief operations (based on need assessment). Mobilize additional relief material required for relief operations. Maintain constant touch with State & Districts EOCs. 	<p>Director DMU, Dist. Collectors, Civil Supply Dept.</p>
	<ul style="list-style-type: none"> Arrangement for transportation 	

	<p>of injured from field hospital to base hospital</p> <ul style="list-style-type: none"> • Arrangement for transport of dead bodies to their native places. 	
	<ul style="list-style-type: none"> • Ensure maintenance of records, timely reporting, and information management. • Ensure maintenance of record and information database. 	Revenue Dept. Health Dept. and Transport Dept
	<ul style="list-style-type: none"> • Remain in constant touch with IMD for updates on weather forecast for the coming days and plan accordingly. • Review the restoration of all the public and essential in Cyclone affected areas. • Review and follow-up all necessary arrangements for emergency response & relief in the affected area/s. 	Revenue Dept. Health Dept. and Transport Dept
	<ul style="list-style-type: none"> • On receiving the message from IMD about degradation of Cyclone, inform the concern dist. Collector. 	Line Departments Dist. Collector,
	<ul style="list-style-type: none"> • Organize a quick rapid visual survey of the affected areas (through a technical team of engineers) to ascertain the safety of the structures and decide on giving permission to people to move back to their respective houses. 	Director DMU
	<ul style="list-style-type: none"> • After receiving the message of de-warning, ensure that people are moved back safely to their houses. 	Director DMU, IMD
	<ul style="list-style-type: none"> • Ensure relief disbursement, allotment of funds and grants to line department and district collectors for organizing emergency response, relief, and evacuation arrangements. 	Secy. R & R, Dist. Collectors, Municipal Commissioner, R & P Dept.

Relief Measures

Short-term Relief Measures

Search, rescue, and medical assistance

- Identification of areas where SAR Teams are to be deployed.
- Coordination of SAR teams for their quick deployment in allotted areas
- Provision of quick transport of SAR teams to affected areas.
- The Department of Roads and Buildings evolves a mechanism for clearing access routes to facilitate search and rescue operations.
- Mobilization of specialized equipment and machinery to affected areas.
- Cordoning of affected areas with control of entry and exit.
- Traffic Management by establishment of traffic points and check-posts.
- The Home Department to evolve a mechanism for providing security of properties of government and public in the affected areas.

Emergency relief (shelter, food, clothing, etc.)

- Establishment of temporary shelters for evacuees.
- Ensuring provision of essential services as under:
- Arrangement for food, clothing, blanket/bedding, drinking water, sanitation and hygiene, lighting arrangements and essential medicines.
- Deployment of mobile hospitals in affected areas for treatment of victims.
- Providing counselling services to the cyclone victims and their relatives.
- Ensure establishment of communication link between the affected people and their relatives outside.
- The Secy. R & R and Director DM Unit to ensure the following in the relief camps:
 - Special emphasis on Hygiene and sanitation aspects should be given in relief camp sites.
 - A separate area should be earmarked within the relief camp for storage of relief materials.
 - Adequate workforce and transport facilities for the camp site.
 - Arrangements to be made for trauma management.
 - Mobile medical units to be sent to remote areas with a view to provide medical assistance to the victims/injured.
 - Information center should be established by the administration.

Interim Relief Measures

- Arrangements to be made for quick identification and maintenance of the records of disposal of dead bodies in the affected areas (Home, Revenue,

Health Dept., Local Authorities).

- Arrangements to be made to record the complaints of all persons reported missing. Follow-up action in verification of the report also needs to be taken. (Home Dept.)
- District Magistrates and sub-divisional magistrates are empowered to exempt identification and post-mortem in case of mass casualties. Revenue Department may depute additional sub-divisional magistrates to expedite disposal of the dead bodies. (Revenue & Home Dept.)
- Unclaimed/unidentified dead bodies to be disposed of with the help of pre identified voluntary agencies at the earliest after keeping their records. (Home, Revenue, Health Dept. & Local Bodies)
- Additional workforce to be deployed in the affected areas to supplement local administration efforts. (GAD).
- Separate Cell to be established at state/district/Taluka level to coordinate with the NGOs and outside donor/aid agencies. (Revenue Dept.)
- Regular meetings of the different stakeholders/departments should be organized at state level for sharing of information, developing strategies for relief operations. (Secy R & R, Director DM Unit & Collectors at District Level).
- Information & Public Relation Dept to coordinate with the media to play a positive role in disseminating appropriate information to public and the government to facilitate the speedy recovery.

Assessment of Damage/Loss and Relief needs

- The Secretary of Relief and Rehabilitation issued instructions to the district collectors to provide the need assessment report. He should consolidate the same and prepare the state's needs assessment report.
- The Secretary of Relief and Rehabilitation to issue instructions to the District Collectors to provide the damage and loss assessment report. The Secretary of Relief and Rehabilitation to consolidate the same and to prepare state's damage and loss assessment report which will be useful in planning and implementing the relief operation after the disaster for the victims of the disaster.
- Adequate workforce, vehicles, stationery etc. should be provided to supplement the efforts for need/loss assessment. (The Secretary of Relief and Rehabilitation Dept.)
- The relief need assessment report should be provided by the Collectors. (The Secretary of Relief and Rehabilitation & Collectors)
- Identification and demolition of dangerous structures in the affected areas to minimize further loss of life and injuries. (R & R Dept., Revenue

Department and Local Bodies)

- Arrangements for distribution of gratuitous relief and cash doles. (Revenue Department, Panchayat & Rural Housing Dept., UD Dept. and Collectors)
- Arrangements to be made for survey of human loss and distribution of ex-gratia relief to the families of deceased persons. (Revenue Dept.)
- Teams to be formed and dispatched to the affected areas for detailed assessment of houses and property damage assessment. (Revenue Dept and Local authorities)
- As reconstruction of houses will take an extended period, arrangements to be made to provide interim shelters to the affected. (Revenue Dept and Line Departments like Water Supply Dept., PWD Dept. etc.)
- Identification of the site for interim shelter
- Allocation of areas to affected families.
- Providing appropriate shelters for the affected families.
- Providing essential services as under in the interim shelter sites.

7.5. Tsunami

Tsunami waves often affect distant shores, originating from undersea or coastal seismic activity, landslides, and volcanic eruption. Whatever the cause, sea water is displaced with a violent motion and swells up, ultimately surging over land with great destructive power.

Disaster Declaration

The INCOIS Hyderabad monitors the generation of tsunami waves in the ocean. Whenever an earthquake of magnitude 6 and above occurs undersea and is likely to become tsunami then INCOIS declares tsunami alert for coastal belts where it may affect.

Onset Type and Causes

If an earthquake of magnitude above 6.0 or under water land movement is near the coast, then tsunami may strike suddenly and if the earth movement is far in the sea, then it may take few minutes to hours before striking the coast. The general causes of Tsunamis are geological movements. The three major ways that cause tsunami are: earthquake, landslides, and volcanic activity.

Early Warning

The public may be able to protect themselves from the Tsunami emergency if they are informed and educated before an emergency. Most of the time tsunami hazard is predictable so warning to public is important part of Action Plan.

The Action Plan is the set of routine activities to be followed by the staff at the tsunami warning center for observation, evaluation, confirmation, and dissemination of bulletins. The Early Warning Centre continuously monitors the seismic activity in the two tsunami genic source regions of the Indian Ocean through the network of national and international seismic stations. This network enables us to detect any tsunami-genic earthquakes within a time of 10 minutes of occurrence. Tsunami bulletins are then generated based on pre-set decision support rules and disseminated to the concerned authorities for action, following the SOP.

The criteria given below is followed for generation of diverse types of advisory bulletin messages (Warning/Alert/Watch) for a particular region of the coast based on the earthquake parameters, available warning time (i.e., time taken by the tsunami wave to reach the coast) and expected run-up from pre-run model scenarios.

Warning/ Alert / Watch

Based on earthquake parameters, region's proximity to the earthquake zone (Travel Times) and expected run-up from pre-run model scenarios Warnings to Far Source Regions: Issued only after confirmation of tsunami triggering based on real-time water-level observations and correction of scenarios. This will reduce the possibility of false warnings.

The warning criteria are based on the premise that coastal areas falling within 60 minutes travel time from a tsunami-genic earthquake source need to be warned based solely on earthquake information, since enough time is not available for confirmation of water levels from Bottom Pressure Recorders (BPRs) and Tide Gauges. Those coastal areas falling outside the 60 minutes travel time from a tsunami-genic earthquake source are put under a watch status and upgraded to a warning only upon confirmation of water-level data, e.g. If a tsunami-genic earthquake happens in the coast of the Northern Indonesia, parts of the Andaman & Nicobar Islands falling within 60 minutes travel time of a tsunami wave are put under 'Warning' status. Other areas are put under 'Watch' Status and upgraded to a 'Warning' only if the BPRs or tide gauges reveal notable change in water level. This implies that the possibility of false alarms is higher for areas close to the earthquake source; however, for other regions since the warnings are issued only after confirmation of water-level data, the issue of false alarms does not arise. To reduce the rate of false alarms even in the near source regions, alerts are generated by analyzing the pre-run model scenarios, so that warnings are issued only to those coastal locations that are at risk.

Category of tsunami advisory bulletins, timeline for generation, content of the alert and dissemination contact information is detailed below: Types Tsunami Bulletin Messages:

Earthquake Information Bulletin (T+20 Min) contains information about origin time, latitude and longitude of the epicenter, name of geographical area, size, and depth of an earthquake. This message also holds preliminary evaluation of tsunami potential based on the magnitude. (e.g., earthquake occurring on land or earthquake with $< M6.5$ or earthquake occurring > 100 Km depth or earthquake occurring in very shallow water column, etc. No tsunami is expected; for larger magnitude earthquakes in the ocean, a qualitative statement on the tsunami-genic potential may be given). No immediate action is required. Bulletins provided to Ministry of Home Affairs (MHA).

Tsunami Warning (T+30 Min) (RED) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is expected. (e.g., For earthquakes with $> M6.5$ occurring in the Ocean within a depth of < 100 Km, a tsunami warning will be issued for those areas falling within 60 minutes travel time from the earthquake source and if expected run up is > 2 m). This is the highest level wherein immediate actions are required to move the public to higher ground. Message also contains information on the travel times and tsunami grade (based on run-up estimates) at various coastal locations from pre-run model outputs. Information provided to Ministry of Home Affairs (MHA) and public.

Tsunami Alert (T+30 Min) (ORANGE) contains information about the earthquake and a tsunami evaluation message indicating that a tsunami is expected. (e.g. For earthquakes with $> M6.5$ occurring in the Ocean within a depth of < 100 Km, a tsunami alert will be issued for those areas falling within 60 minutes travel time from the earthquake source and if expected run up is between 0.5 to 2 m as well as for those areas falling above 60 minutes travel time from the earthquake source and if expected run up is > 2 m). This is the second highest level wherein immediate public evacuation is not required. The public should avoid beaches since strong currents are expected. Local officials should be prepared for evacuation if it is upgraded to warning status. Message also contains information on the travel times and tsunami grade (based on run-up estimates) at various coastal locations from Pre-run model outputs. Information provided to Ministry of Home Affairs (MHA) and public.

Tsunami Watch (T+30 Min) (YELLOW) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is expected. (e. g. For earthquakes with $> M6.5$ occurring in the Ocean within a depth of < 100 Km, a tsunami watch will be issued for those areas falling within 60 minutes travel time from the earthquake source and if expected run up is < 0.5 m and for those areas falling above 60 minutes travel time from the earthquake source and if expected run up is 0.5 to 2 m). This is the third highest level wherein immediate public evacuation is not required, Local officials should be prepared for evacuation if it is upgraded to warning status. Message also contains information on the travel times and tsunami

grade (based on run-up estimates) at various coastal locations from Pre-run model outputs. Information provided to Ministry of Home Affairs (MHA).

Tsunami cancellation (GREEN) will be issued if the tsunami warning was issued based on erroneous data or if the warning center determines from subsequent information that only an insignificant wave has been generated. In addition, tsunami warning may be canceled on a selective basis when a significant wave that has been generated clearly poses no threat to one or more of the areas the warning center warns, either because of intervening continents or islands which screen them or because the orientation of the generating area causes the tsunami to be directed away from these areas. To maintain credibility the warning center will use the terminology “non-destructive tsunami” in the cancellation message whenever applicable.

Tsunami All Clear (GREEN) bulletin indicates that the ‘Tsunami Threat’ has passed, and no more dangerous waves are expected.

Trigger Mechanism: Plan Activation

The tsunami response structure will be activated on a major tsunami. The Secretary of Relief and Rehabilitation will activate all the Departments for emergency response including the State EOC.

Once the situation is totally controlled and normalcy is restored, the Secretary of Relief and Rehabilitation declares End of Emergency Response and issues instructions to withdraw the staff deployed in emergency duties.

Roles and Responsibilities

Task	Activities	Responsibility
Management of EOC and Tsunami Response	<ul style="list-style-type: none"> • After reviewing the satellite images, issue instructions and orders for emergency response to areas likely to be affected. • Take over full command of the State EOC. • Instruct line departments to depute representatives at the State and District EOCs. • Hold a meeting with leaders of task forces and entrust them with their tasks. • Ensure that Tsunami information is disseminated to all who are at danger. • Arrange an emergency meeting with 	Secretary R & R, Secretary Transport

	<p>the State Crisis Management Group to devise a plan of action.</p> <ul style="list-style-type: none"> • Arrange dissemination of information through various means of communication such as Radio, TV, Cable Network, SMS about Tsunami to districts/areas which are likely to be hit. • Impose restrictions on all transport activities heading towards coastal areas likely to be affected by the Tsunami. 	
<p>Set up inter-departmental coordination</p>	<ul style="list-style-type: none"> • Instruct all State government officers and employees in the State to report to their respective Head for emergency duties (Only if the warning is of a level 2 disaster or as per the decision taken in the meeting of the Crisis Management Group headed by Chief Secretary). • Alert the District Collectors of districts not likely to be affected to be prepared for providing: <ul style="list-style-type: none"> ○ Additional workforce. ○ Additional resources (Machinery & Equipment, Relief material to the districts likely to be affected) 	<p>Secretary R & R, GAD</p>
<p>Activate EOCs with communication system</p>	<p>Mobilize following teams:</p> <ul style="list-style-type: none"> • Evacuation. • Emergency Medical Services • Search and Rescue <p>Mobilize following emergency response forces:</p> <ul style="list-style-type: none"> • Fire & Emergency Services • NDRF • Village Disaster Management Teams Police, Home Guards • State Reserve Police Force • Army (if required) • Air Force (if required) 	<p>Secretary R & R</p>

<p>Review of situation and issue of instructions and orders</p>	<ul style="list-style-type: none"> Establish contact with IMD, INCOIS, ISRO and the defense ministry of GoI for aerial / satellites imageries. 	<p>Director DMU</p>
<p>Preparedness measures for timely response to coastal areas (likely to be affected)</p>	<ul style="list-style-type: none"> Based on the warning issued by IMD, pinpoint the districts and villages likely to be affected by Tsunami and start the procedure for identifying safe places/shelters for evacuation in those villages. Village wise data of safe sheltering for evacuation available with district collector should be referred and the dist. collectors/village level officers should be contacted to know the status of the shelters with the capacity of the shelter and other available facilities at the site. Make transport arrangements for mobilization of all emergency response teams. 	<p>Director DMU, Transport Dept., Dist. Collector, Municipal Commissioner</p>
	<ul style="list-style-type: none"> Ensure arrangements are in place to evacuate fishermen and salt workers if needed. 	<p>Ports & Fisheries Dept., Revenue Dept.,</p>
	<ul style="list-style-type: none"> Ensure safety of tourists visiting beaches along the coastline. 	<p>Tourism Dept.</p>
	<ul style="list-style-type: none"> Cordoning off coastal areas for restricting entries of rail or road traffic. Ensure law and order is maintained in areas likely to be affected. 	<p>Home Dept., Dist. Collector, Municipal Commissioner</p>
	<ul style="list-style-type: none"> Ensure that all critical activities (mainly industrial production) in areas likely to be affected are shut down. Ensure that all critical activities (mainly industrial production) in areas likely to be affected are shut down 	<p>Industry Dept. other line Depts.</p>
	<ul style="list-style-type: none"> Ensure dissemination of information to remote areas by local means. Ensure that local help lines are opened and effectively managed for public information, guidance, and 	<p>Dist. Collector, Municipal Commissioner, Information Dept.</p>

	<p>rumor control.</p> <ul style="list-style-type: none"> • Ensure that the information to public and media about the progress of Tsunami at periodic intervals is released. 	
	<ul style="list-style-type: none"> • Health Department to activate their Departmental Tsunami Disaster Management Plan and Departmental SOPs for Management of casualties • Assess the need for fodder if required. • Keep teams ready for carcass disposal (if required). 	<p>Health Dept, Animal Husbandry</p>
	<ul style="list-style-type: none"> • Review and monitor following activities: • Evacuation of people from coastal areas likely to be affected. • Positioning of Search and Rescue Teams • Positioning of mobile communication units • Positioning of quick medical response teams • Mobilization of restoration teams of respective departments • Requirement of armed forces in rescue and relief operations • Dissemination of information to the vulnerable areas • All preparedness measures to be taken by various authorities. • Keep in touch with National, District and Taluka Control Rooms • Release information at appropriate time to media and public regarding response measures organized by the Government 	<p>Secretary R & R, Information Dept.</p>
	<ul style="list-style-type: none"> • Ensure that the Relief Management work planned in the areas likely to be affected by the Tsunami is well organized. 	<p>Secretary R & R</p>
	<ul style="list-style-type: none"> • Ensure that the arrangement for basic amenities (shown below) at 	<p>Civil Supply Dept., Revenue Dept. &</p>

	<p>evacuation/relief centres are made by the respective departments:</p> <ul style="list-style-type: none"> ○ Drinking water ○ Food ○ Clothing ○ Sanitation and hygiene, ○ Lighting ○ Medicines and other Health Care 	<p>Dist. Collector, Municipal Commissioner</p>
		<p>Municipal Commissioner, Water Supply Dept., Health Dept</p>
	<ul style="list-style-type: none"> ● Inform following agencies to be in a state of readiness for assisting in the Tsunami response measures (if required): <ul style="list-style-type: none"> ○ Public sector agencies ○ Private sector agencies ○ NGOs ○ CBOs ○ Volunteer Organizations ○ Request for help (if needed) to MHA/National Disaster Management Authority 	<p>Revenue Dept.</p>
	<ul style="list-style-type: none"> ● Make necessary arrangements for public information/guidance, public opinion, and rumor control. 	<p>Information Dept.</p>
<p>Disaster Declaration</p>	<ul style="list-style-type: none"> ● Record the reports in detail with time, source of reports etc. and declare the area as disaster affected, if necessary, (depending upon the nature and intensity of impact) 	<p>Director DMU, Dist. Collector,</p>
<p>Preliminary damage assessment, deployment of emergency response teams and dissemination of information</p>	<ul style="list-style-type: none"> ● Dist. Collector/s should send teams to the affected areas to take stock of the effects of Tsunami. 	<p>Dist. Collector, Municipal Commissioner</p>
	<ul style="list-style-type: none"> ● District Collector/s should send sector wise situation reports to: State EOC/ Secretary DM & SDMA 	
	<ul style="list-style-type: none"> ● Deployment of following teams to Tsunami affected areas: <ul style="list-style-type: none"> ○ Emergency Communication Teams ○ Emergency Medical Services Teams ○ Search and Rescue Teams (With 	<p>Secretary R & R, Dist. Collector, Municipal Commissioner,</p>

	<p>Equipment)</p> <ul style="list-style-type: none"> ○ Preliminary Damage Assessment Teams ○ Need Assessment Teams 	
	<ul style="list-style-type: none"> ● Establish communication links with affected districts by activating alternate communication equipment such as Satellite Phones, HF/VHF Sets, Ham Radio, V Set etc., in State/District EOCs and Taluka Control Rooms. ● Arrange dissemination of information about occurrence of Tsunami and areas that are affected by it to Media & Public. 	<p>Director DMU, Dist. Collector, Municipal Commissioner, Information Dept.</p>
<p>Mobilization and deployment task forces</p>	<p>Immediate mobilization of following units to areas affected by Tsunami.</p> <ul style="list-style-type: none"> ● S & R Teams of Fire and Emergency Services ● Quick Medical Response Teams ● Quick Damage & Loss Assessment Teams ● Quick Need Assessment Teams ● Road Clearance Teams ● Teams for disposal of dead bodies ● Teams for disposal of carcasses ● Teams for debris clearance (if any) ● Teams for maintaining Law & Order in the affected areas. ● Arrange for S & R teams of Air Force (If required). 	<p>Secretary R & R, Municipal Commissioner, Concern line Dept.</p>
<p>Measures for quick and organized response</p>	<p>State EOC, the Collectors of the affected District/s should ensure that the following response activities are carried out immediately:</p> <ul style="list-style-type: none"> ● Clearance of access roads ● To survey the access roads/routes leading to the affected areas and manage traffic for mobilization of equipment, machinery, and volunteers. ● Identify alternate roads/routes for evacuation. ● Undertake repairing/restoration of 	<p>Secretary R & R, Collector, Municipal Commissioner, Line Dept.</p> <hr/> <p>PWD Dept., Transport Dept., Dist. Collector, Municipal Commissioner, Railways, Revenue</p>

	<p>damaged roads leading to the affected areas.</p> <ul style="list-style-type: none"> • Identify and declare unsafe buildings/structures in Tsunami affected areas. • Evacuate people from unsafe buildings/ structures and shift them to relief camps/sites. 	
	<p>Arrangement of basic facilities at relief/evacuation centers</p> <ul style="list-style-type: none"> • To ensure that necessary arrangements at evacuation/relief centers are made with enough food, water, blankets/clothing, medicines, lighting, sanitation, and hygiene, etc. • To ensure necessary security arrangements for the personals (Emergency responders/relief teams) who are working at Relief Centers and involved in distribution of Relief Materials. • To ensure that law and order is maintained at evacuation/relief centers and in the affected areas as well. 	<p>Revenue Dept., Civil Supply Dept., Collector, Municipal Commissioner, Water Supply Dept., Health Dept., Power & Energy Dept., Local Authorities, Home Dept.</p>
	<p>Safety of fishermen and salt workers</p> <ul style="list-style-type: none"> • Immediate actions to be taken for safety of fishermen, salt workers and visitors at Tsunami affected coastal areas. • Ensure that all the fishermen and salt workers have returned from the sea or those who are in the sea are rescued and evacuated to safer places. 	<p>Revenue, Port and Fisheries Dept., Tourism Dept., Industrial Dept.</p>
	<p>Control of outbreak of disease</p> <ul style="list-style-type: none"> • To establish camp hospitals near the affected areas. • To make transportation arrangements to shift seriously injured persons to nearest- Camp Hospitals, Taluka and District Hospitals, Regional and State Hospitals • Ensure that the Hospitals are well 	<p>Secretary Health, Secretary Transport, Secretary R & R.</p>

	<p>prepared to deal with seriously injured persons.</p> <ul style="list-style-type: none"> • To ensure that the required medical assistance/aid and medicines are provided to the affected people at site as well as at evacuation/relief centers in the affected area and necessary records are maintained. • Take sanitation and epidemic control measures for preventing any water borne disease. • Keep adequate stock of essential medicines, first aid etc. at taluka/district hospitals • Take steps to purify drinking water sources • If required, take the help of doctors/paramedics from the list of doctors/paramedics available at the taluka/district level for immediate medical assistance. 	
	<p>Other important response measures</p> <ul style="list-style-type: none"> • Prepare quick need assessment report for planning of relief operation. • Additional assistance may be asked for emergency response/relief from GoI-NDMA (If needed). • Maintain constant touch with National, District and Taluka EOCs and other control rooms. • Conduct Arial survey of affected areas for taking a stalk of the situation. 	
	<ul style="list-style-type: none"> • Establish Media/Press Centre for media management and information dissemination. • Ensure that the information about progress of rescue and relief is provided to media/public at least twice a day at pre-determined intervals. • Establish help lines for facilitating communication between the victims and their relatives residing outside the 	<p>Director DMU, Information Dept., Dist. Collector, Municipal Commissioner</p>

	<p>affected area/s.</p> <ul style="list-style-type: none"> • Establish Information Centers at strategic locations for providing information about persons evacuated to the relief centers/hospitals. 	
	<ul style="list-style-type: none"> • Ensure that the essential services/critical infrastructure of the affected areas has been restored or alternative arrangement is made for ensuring safety of people and smooth management of emergency response. • Ensure that key administrative and lifeline buildings are brought back to operation quickly. • Ensure the following primary necessities are restored-Power, Water, Telecommunication, Roads, and Bridges. 	<p>Revenue, Line Depts., Dist. Collector, Municipal Commissioner.</p>
	<ul style="list-style-type: none"> • Ensure following procedure is followed before disposal/handing over of dead bodies: • Photographs of the dead bodies are taken, Identification of the dead bodies is done. • Postmortem wherever necessary and possible is carried out, • Handing over dead bodies of persons known/ identified to their relatives, • Disposal of unclaimed and unidentified dead bodies. 	<p>Revenue Dept., Collector, Municipal Commissioner, Home Dept., Health Dept., Local Authorities</p>
	<ul style="list-style-type: none"> • Animal Husbandry Department to ensure medical aid to cattle that are injured. • Disposal of animal carcasses with the help of local bodies/health dept. 	<p>Animal Husbandry Dept, Local Authorities, health dept.</p>
	<ul style="list-style-type: none"> • Assess the situation and take appropriate action to accelerate the Search & Rescue Operations. • Depute additional officers and supporting staff to Tsunami affected areas from non-affected areas (if required) to accelerate the rescue and 	<p>Director DMU, Districts Collector, Municipal Commissioner</p>

	relief operations.	
	<ul style="list-style-type: none"> • Ensure that the relief assistance received from outside is centrally received, stored, and sent for distribution to Tsunami affected areas according to their need and proper accounts are maintained about both receipt and distribution. 	Revenue, Civil Supply Dept.
	<ul style="list-style-type: none"> • District Collector may oversee the functioning of relief centres and ensure adequate supply of relief materials. 	Revenue Dept, Civil Supply Dept.,
	<ul style="list-style-type: none"> • Arrange for procurement of additional relief material required for relief operations (on the basis of need assessment). • Mobilize additional relief material required for relief operations. • Maintain constant touch with State & Districts EOCs. 	Director DMU, Dist. Collector, Municipal Commissioner, Civil Supply Dept.
	<ul style="list-style-type: none"> • Arrangement for transportation of injured from field hospital to base hospital. • Arrangement for transport of dead bodies to their native places. 	Revenue Dept. Health Dept., Transport Dept
	<ul style="list-style-type: none"> • Ensure maintenance of records, timely reporting, and information management. • Ensure maintenance of record and information database. 	
	<ul style="list-style-type: none"> • Review the restoration of all the public and essential in Tsunami affected areas. • Review and follow-up all necessary arrangements for emergency response & relief in the affected area/s. 	Secretary R & R
	<ul style="list-style-type: none"> • After receiving the message of de-warning, ensure that people are moved back safely to their houses. 	Secretary R & R, Collector, Dy. SP
	<ul style="list-style-type: none"> • Organize a quick rapid visual survey of the affected areas (through a technical team of engineers) to ascertain the safety of the structures and decide on 	Secretary R & R, Dist. Collectors, Municipal Commissioner,

	giving permission to people to move back to their respective houses.	
	<ul style="list-style-type: none"> • Ensure relief disbursement, allotment of funds and grants to line department and district collectors for organizing emergency response, relief, and evacuation arrangements. 	Revenue Dept.

Relief Measures

Short-term relief measures

1. Provide temporary shelter to affected people
2. Temporary shelter sites should be safe, and easily accessible.
3. Continue to provide essential services to the affected people, (food, water, clothing sanitation, medical assistance, and power)

The Secretaries of Line Departments and concerned Collectors to ensure the following in the relief camps: -

- Special emphasis on hygiene and sanitation aspects should be given in relief campsites. (Health Dept.)
- A separate area should be earmarked within the relief camp for storage of relief materials. (Civil Supply & PWD Dept.)
- Adequate workforce and transport facilities for the camp site. (Transport Department)
- Arrangements to be made for trauma management. (Health Department)
- Mobile medical units to be sent to remote areas to provide medical assistance to the victims/injured. (Health Dept.)
- The information centre should be established by the administration. (I. & P. Department)

Interim Relief Measures

- Arrangements to be made for quick identification and maintenance of the records of disposal of dead bodies in the affected areas (Home, Revenue, Health Dept., Local Authorities).
- Arrangements to be made to record the complaints of all persons reported missing. Follow-up action in verification of the report also needs to be taken. (Home Dept.)
- District Magistrates and sub-divisional magistrates are empowered to exempt identification and post-mortem in case of mass casualties. Revenue Dept may depute additional sub-divisional magistrates to expedite disposal of the dead bodies. (Revenue & Home Dept.)

- Unclaimed/unidentified dead bodies to be disposed of with the help of pre identified voluntary Agencies at the earliest after keeping their records. (Home, Revenue, Health Dept. & Local Bodies)
- Additional workforce to be deployed in the affected areas to supplement local administration efforts. (GAD).
- Separate Cell to be established at state/district/Taluka level to coordinate with the NGOs and outside donor/aid agencies. (Revenue Dept.)
- Regular meetings of the different stakeholders/departments should be organized at state level for sharing of information, developing strategies for relief operations. (Secy. R & R & Collectors at District Level).
- Information & Public Relation Dept (DGIPR) to coordinate with the media to play a positive role in disseminating appropriate information to public and the government in order to facilitate the speedy recovery. (DGIPR)

Assessment of Damage/Loss and Relief needs

- The Secy. R & R to issue instructions to the district collectors to provide the need assessment report. The Secy. R & R should consolidate the same and prepare the state's need assessment report.
- The Secy. R & R to issue instructions to the District Collectors to provide the damage and loss assessment report. The Secy. R & R to consolidate the same and to prepare state's damage and loss assessment report which will be useful in planning and implementing the relief operation after the disaster for the victims of the disaster.
- Adequate workforce, vehicles, stationery etc. should be provided to supplement the efforts for need/loss assessment. (Secy. R & R Dept.)
- The relief need assessment report should be provided by the Collectors. (Secy. R & R & Collectors)
- The damage assessment Performa is also attached in the annexure. (Secy. R & R & Collectors)
- Identification and demolition of dangerous structures in the affected areas to minimize further loss of life and injuries. (PWD Dept., Revenue Dept and Local Bodies)
- Arrangements for distribution of gratuitous relief and cash doles. (Revenue Dept., Panchayat & Rural Housing Dept., UD Dept. and Collectors)
- Arrangements to be made for survey of human loss and distribution of ex-gratia relief to the families of deceased persons. (Revenue Dept.)
- Teams to be formed and dispatched to the affected areas for detailed assessment of houses and property damage assessment. (Revenue Dept and Local authorities)

- As reconstruction of houses will take a prolonged period, arrangements to be made to provide interim shelters to the affected. (Revenue Dept and Line Departments like Water Supply Dept., PWD Dept. etc.)
- Identification of the site for interim shelter
- Allocation of areas to affected families.
- Providing appropriate shelters for the affected families.
- Providing essential services as under in the interim shelter sites. (Water, Transportation, Power, Road, Drainage/Sanitation)

7.6. Landslides

Landslides are caused due to natural and anthropogenic factors. It is downward movement of landmass such as mud, rock, boulders, vegetation, etc. under the influence of gravity. It occurs on mountain slopes and riverbanks. Landslides of several types occur frequently in the geo-dynamically active domains in the Himalayan and North-Eastern parts of the country as well as relatively stable domains in the Western Ghats and Nigiri hills in the Southern part of the country by this hazard, mostly during the monsoons. (*Source: Hazards, Disasters, and your community*)

The Western Ghats, overlooking the Konkan coast, though located in a relatively stable domain, experience the fury of this natural hazard due to steep hill slopes, overburden, and high intensity rainfall. The Western Ghats bear the innumerable scars of landslides due to their location in a zone of high intensity and protracted rainfall where overburden is sensitive to over-saturation.

Onset type and warning

Sudden sliding can occur without warning. They may take place in combination with earthquakes, floods, and volcanoes. It is difficult to predict the actual occurrence of landslides since there is no established early warning system in place. Areas of high risk, largely hill stations, can be determined by using information on geology, hydrology, vegetation cover, past occurrence and consequences in the region.

Authority & Disaster Declaration

The district administration deals this disaster with the help of local authorities and inform the same to State Authority. Based on the information on occurrence of landslides in certain areas from local authority/district collector the SDMA declares landslide disaster affected areas.

Response Mechanism

- The SEOC should be activated for emergency response.

- Report the information to the higher authorities at State and National level.
- Alert the State search and rescue teams and consult with district administration for their deployment in affected areas if necessary.
- Stay in touch with district administration and local authorities and send search and rescue teams and necessary rescue equipment as and when required.
- Communicate with NDRF in time and alert it to get ready for SAR operation if district administration needs.
- Inform all government line departments to support district administration with reuse and relief materials, workforce, and other critical supplies.

Relief Measures

- Set up temporary shelters for evacuees.
- Make provision for essential services like food, clothing, blankets/bedding, drinking water, light, and essential medicines.
- Deployment of First Aid team and medicines.
- Arrange transportation for patients to take them to hospitals in case of serious condition.
- Maintain law and order in the affected sites.
- Take particular care of old persons, pregnant women, disables and children.

7.7. Nuclear and Radiological Emergencies

The growth in the application of nuclear science and technology in the fields of power generation, medicine, industry, agriculture, research and defense has led to an increase in the risk of occurrence of Nuclear and Radiological emergencies.

As on date, 17 power reactors and five research reactors are in operation in India, six power reactors are under construction, and plans exist to set up thorium-based reactors to meet the ever-increasing energy needs. Further, India is also one amongst the seven declared nuclear weapon states which uses nuclear technology for strategic purposes.

Maharashtra is one of the Nuclear Plant states in the country. It holds a prominent position in the nuclear energy sector of India. Thus, nuclear disasters may not be ignored in future on account of terrorist attacks, technical errors or natural activities which include geological activities like earthquakes, natural fires, floods etc.

Scope of the Action Plan

This plan document has tremendous scope to address the issues from receiving emergency intimation to immediate response actions.

Nuclear and Radiological Emergency/Disaster Scenarios

- An accident taking place in any nuclear facility of the nuclear fuel cycle including the nuclear reactor, or in a facility using radioactive sources, leading to a large-scale release of radioactivity in the environment.
- A “criticality” accident in a nuclear fuel cycle facility where an uncontrolled nuclear chain reaction takes place accidentally leading to bursts of neutrons and gamma radiation (as had happened at Tokaimura, Japan).
- An accident during the transportation of radioactive material.
- The malevolent use of radioactive material as Radiological Dispersal Device (RDD) by terrorists for dispersing radioactive material in the environment.
- A large-scale nuclear disaster resulting from a nuclear weapon attack (as had happened at Hiroshima and Nagasaki in Japan) which would lead to mass casualties and destruction of large areas and properties.

Regulatory Body

- The Atomic Energy Regulatory Board (AERB) is the nuclear regulatory authority in India which, as per the legal framework of Atomic Energy Act, 1962, has the mandate for issuance of licenses to nuclear and radiation facilities upon ensuring compliance with the applicable standards and codes.
- It is emphasized that the AERB, which oversees nuclear and radiological safety in the country, has the powers to not only license the operation of a facility but also the power to order partial or full shutdown of any facility that violates its guidelines.
- The AERB has been playing a very crucial role in the prevention of nuclear/radiological accidents by ensuring that proper safety design features and operating procedures in all nuclear and radiation facilities are in place.

Authority

- The Department of Atomic Energy (DAE) has been identified as the nodal agency in the country for providing the necessary technical inputs to the national or local authorities for responding to any nuclear or radiological emergency in the public domain.
- The Ministry of Home Affairs (MHA) is the nodal ministry in such emergencies. For this purpose, a Crisis Management Group (CMG) has been functioning since 1987 at DAE.
- In the event of any radiological or nuclear emergency in the public domain, the CMG is immediately activated and will co-ordinate between the local authority in the affected area and the National Crisis Management Committee (NCMC). The CMG comprises of senior officials drawn from various units of DAE like the Nuclear Power Corporation of India Ltd. (NPCIL), Bhabha Atomic Research Centre (BARC). It also includes a senior official from the regulatory authority, the Atomic Energy Regulatory Board (AERB). Each member is backed by an alternate member, so that the CMG can be activated at noticeably short notice.

Several Resource Agencies from BARC also back up the CMG. They can provide advice and assistance in the areas of radiation measurement and protection and medical assistance to radiation affected personnel.

- For an effective response to any major nuclear emergency, an immediate communication 20 Emergency Response Centres (ERCs) have been established across the country, by BARC and DAE.
- In the case of Maharashtra, the ERC at Mumbai BARC and other national resources such as the Armed Forces etc. shall deal with the situation. The State Government and its agencies' role such as the Maharashtra State Disaster Management Authority (MSDMA) will only be supportive and at the directions of the CMG.
- Mutual Aid Response Groups (MARG) in the State can effectively mobilize resources and play vital role to reduce consequences.

Trigger Mechanism

The Trigger Mechanism prescribes the way the disaster response system shall be automatically activated after receiving early warning signals of a disaster happening or likely to happen or on receipt of information of an incident. As a basic regulatory requirement, emergency preparedness exists at BARC to respond to any on-site emergency in their areas. But to handle radiological emergencies arising from a transport accident or from movement/handling of “orphan sources” (radioactive sources that have lost regulatory control) or due to malevolent acts like explosion of a Radiological Dispersal Device (RDD), Radiation Exposure Device (RED) or Improvised Nuclear Device (IND) any time or anywhere in the State, a network of 18 number of Emergency Response Centres (ERCs) has been established by Bhabha Atomic Research Center (BRAC) and Department of Atomic Energy (DAE). This network is basically meant for responding to such emergencies and also for providing timely advice and guidance to the first responder at the State and National level. The ERC (BARC) is equipped with radiation monitoring instruments, protective gear, and other supporting infrastructures. Various units of Nuclear Emergency Response Teams (ERTs), consisting of personnel from different DAE units are also being raised. The centralized agency, called the management activities not only by activating these ERC and ERTs but also by mobilizing the resources from all DAE facilities, at the time of crisis.

Line of Communication and Responsibility for the State

Nuclear Disaster is a situation where the chances of receiving any early warning are incredibly low. In such a situation where no early warning signals are available, the primary objective of the trigger mechanism shall be to mount immediate isolation. The following procedure shall be followed in such situations:

- For metropolitan areas, the Incident Commander for all nuclear hazards shall be the Commissioner of Police (CP). For other areas it will be the District Magistrate (DM).
- The field functionary at ground zero shall inform the District Emergency Operation Centre (DEOC), the Commissioner of Police in a metropolitan area and the District Magistrate of the incident. DEOC / District Magistrate/ Commissioner of Police shall inform the State Emergency Operation Center (SEOC), Emergency Response Centers (ERCs), the Secretary of DM and MSDMA.

Immediately thereafter, personnel from the AERC will determine the source of the radioactive emission and its strength (*See below, IAEA-EPR-FIRST RESPONDERS 2006) and report the same to the Commissioner of Police. In non-Metropolitan Area, the District Collector will inform the MSDMA, Emergency Response Centers for carrying out the function.

- The Secretary R & R or MSDMA shall convene an immediate meeting about the Crisis.
- The Secretary R & R or MSDMA shall convene an immediate meeting of the Crisis Management Group under the Chief Secretary.
- The Secretary R & R shall inform the National Emergency Operation Center (NEOC) and if required coordinate with Bhabha Atomic Research Center (BARC) for specialized support team from the 18 ERCs.
- The Commissioner of Police in a metropolitan area and the District Magistrate in others shall review the situation and activate coordination, command, and control.
- The Secretary of Health (SoH) shall place medical and para-medical teams if required at the disposal of the Incident Commander.
- The Fire Brigade as well as personnel/vehicles/equipment from MSDMA's Emergency Response Centers (ERCs) will report to the Incident Commander.
- The Secretary R & R shall also coordinate immediate evacuation of potentially affected civilians with the Commissioner Police (CP), Municipal Commissioner and Collector.
- Team for Rapid Assessment of damage shall be deployed.
- Chemical Biological Nuclear and Radiological team (CBRN) shall be formed and deployed to ground zero by the incident commander, i.e., Commissioner of Police in metropolitan areas and by the District Magistrate (DM) in other areas.

Response Mechanism

Response measures are those, which are taken instantly prior to, and following, a Nuclear & Radiological emergency aimed at limiting injuries, loss of life and damage to property and the environment and rescuing those who are affected or likely to be affected by it. The National Executive Committee (NEC) will ensure that the

functions and responsibilities of the nuclear facility operators and response organizations are clearly defined and understood by all stakeholders. The MHA and the NEC will also determine the actions that need to be performed by each organization during an emergency and whether it has the necessary resources and capabilities needed for the purpose. The advice of the National Crisis Management Committee (NCCMC) will also be sought in this matter.

7.8. Industrial Chemical Disasters

In the event of fires, chemical leaks or explosions occurring in industrial facilities, people are exposed to dangers like fire, poison/chemical gas, low oxygen level and contamination of land, water, and air. Maharashtra, being a highly industrialized State, is prone to chemical and industrial hazards. Most of the hazardous factories are in Thane, Raigad, Mumbai, and Pune districts. Chemical industries, handling many chemicals as raw materials, in processes, products, and wasters, with flammable, explosive, corrosive, toxic and noxious properties are likely to cause major industrial and chemical hazards. Any accident involving these may have an adverse impact on both the community and the environment.

Maharashtra Industrial Development Corporation (MIDC) is a project of the government of Maharashtra state in India and is the leading corporation of Maharashtra. It provides businesses with infrastructure such as land (open plot or built-up spaces), roads, water supply, drainage facilities and streetlights. MIDC areas are spread all over the state of Maharashtra. The MIDC started in 1962 with Wagle estate, Thane as its first industrial area.

MIDC's major industrial areas are in Tarapur, Boisar, TTC (Trans Thane Creek) near Thane and Navi Mumbai, Pimpri-Chinchwad near Pune, Satpur, Ambad, Sinnar, Gonde near Nashik, Butibori 5 Star MIDC, Nagpur, Kagal 5 Star MIDC, Kolhapur, Gokul Shirgaon MIDC, Kolhapur, Shirol MIDC, Kolhapur, Nanded 5 Star MIDC, Nanded, Satara MIDC, Satara, Degaon 5 star MIDC, Satara, Kupwad, Sangli, Miraj, Sangli, Latur, Latur, Waluj near Aurangabad, Islampur near Sangli

Onset type and warning

Onset in case of industrial disaster can be either rapid (minutes to hours) or sudden (no warning) depending on the nature of occurrence. Chemical disasters, in general, may result from: fire, explosion, toxic release and poisoning.

As there is a series of processes and reactions involved the onset may vary accordingly. Release of chemicals may be because of human error, technological failure or natural activities which include geological activities like earthquakes, natural fires, floods etc. The industrial facility should have a monitoring and warning system for fire and building up of dangerous conditions. Explosion in some cases can be anticipated.

Emergency	Activity	Responsibility
Off-Site Emergency	<ul style="list-style-type: none"> • Declare an off-site emergency in consultation with Site Emergency Director. • Activate an offsite emergency control centre. • Establish immediate communication with ERC, State Government and the CMG, DEA. • Arrange an immediate deployment of various ERTs in affected sector(s). 	District Collector
	<ul style="list-style-type: none"> • Arrange an evacuation of the public to safer places. • Activate systems of the State machinery to meet the necessary requirements of the public in the camp till the people are in a position to go back to their homes after the affected areas are cleared and declared safe. • Deploy Quick Reaction Medical Teams (QRMTs)/ Medical First Responders (MFRs) consisting of physicians, triage officer, Radiological Safety Officer (RSO), nurses and paramedical staff. 	
	<ul style="list-style-type: none"> • To ensure that necessary arrangements at evacuation/relief centers are made with enough food, water, blankets/clothing, medicines, lighting, sanitation, and hygiene, etc. • To ensure necessary security arrangements for the personals (emergency responders/relief teams) who are working at Relief Centers and involved in distribution of Relief Materials. • To ensure that law and order is maintained at evacuation/relief centers and in the affected areas as well. 	<p>Secretary R & R, Civil</p> <p>Supply Dept., Collectors, Municipal Commissioner, Water Supply Dept., Health Dept., Power & Energy Dept., MSEB & Local Authorities,</p> <p>Home Dept.</p>

	<ul style="list-style-type: none"> • Make an arrangement for providing timely and appropriate information to the public in the event of a nuclear or radiological emergency. • Ensure that the information to media/general public about the coordinated response is released in an organized manner. 	<p>Director DMU, Collector, Info. Dept., Municipal Commissioner,</p>
	<ul style="list-style-type: none"> • Immediately activate and co-ordinate between the local authority in the affected area and the National Crisis Management Committee (NCCM). 	<p>Crisis Mgmt. Group</p>
<p>Nuclear/ Radiation emergency</p>	<ul style="list-style-type: none"> • Recognize the existence of an abnormal situation. • Identify and characterize the source and its origin. • Initiate a quick and reliable monitoring methodology to detect the onset of an accident/emergency condition and assess its magnitude. • Communicate the situation to fire fighting and medical services, police, civil defense, transport, and other agencies. • Estimate the dose via the relevant pathways. (*Dose Limits for exposures to ionizing radiations for occupational workers given here below) 	<p>ERC, DEA, AERB, CMG, Dist. Collector, Commissioner of Police, Municipal Commissioner,</p>
	<ul style="list-style-type: none"> • Support decision making on protective measures for the population and the environment. • If required, distribute iodine tablets at the earliest (iodine prophylaxis). • Respond quickly to the situation and mobilize resources at short notice. • Initiate countermeasures at the earliest (for relief and rescue operations on the basis of actual radiation dose levels prevailing in different zones). • Make sure immediate measures need to be taken as the situation develops. 	<p>Dist. Collector, Municipal Commissioner, Health dept., Police dept</p>

	<ul style="list-style-type: none"> • Ensure that the actions taken by the various agencies are well coordinated. 	
	<ul style="list-style-type: none"> • Send prior information (in respect of dos and don'ts) to those likely to be affected by the accident/emergency. These include: <ul style="list-style-type: none"> • Evacuation/temporary relocation of the affected population, if required. • Withdrawal and substitution of supplies of food and drinking water (based on actual measurement of contamination found in food and drinking water). • Animal husbandry and agriculture department personnel to ensure radiological protection following a nuclear emergency. • Initiation of the recovery phase at an appropriate time. 	<p>Director DMU. Home Dept., State EOC, Civil Supply Dept., Animal and Husbandry dept., Information dept.</p>
<p>“Criticality” Accidents</p>	<ul style="list-style-type: none"> • Critical Situation in a nuclear facility is a situation of national emergency. In the case of Maharashtra, the ERC at Maharashtra and other national resources such as the Armed Forces etc. shall deal with the situation. The role of the State Government and its agencies such as the Maharashtra State Disaster Management Authority will only be supportive and be at the direction of the Crisis Management Group set up by the Union /Central Government. 	<p>ERC, CMG, NEC, DEA</p>
<p>Transportation of Radioactive Materials</p>	<ul style="list-style-type: none"> • On discovery of any such accident, the District Magistrate in a district or the Commissioner of Police in a metropolitan area, shall inform the following – <ul style="list-style-type: none"> ○ The ERC at Mumbai (Nodal ERC) The SEOC at Mantralaya, Mumbai ○ The Secretary of Relief and Rehabilitation ○ The Secretary, DMU 	<p>DM or SP</p>
	<ul style="list-style-type: none"> • Mobilize and operate incident command 	

<p>Radiological Dispersal Device Emergency</p>	<ul style="list-style-type: none"> • Oversee victims' triage • Make sure that the site is cordoned, and the perimeters are controlled and managed • Ensure notification and activation of special teams • Ensure traffic and access control • Ensure protection to at risk and vulnerable population • Gender issues must keep in mind • Provide resources support and requests for assistance. • Ensure public works coordination. • Ensure public information, outreach, and communication activities. • Seal off the inner zone of 400m (about 1312.34 ft) radius from the blast point as „no entry area except for emergency measures. • Perform life-saving rescue and emergency first aid for seriously injured. • Remove injured persons as far away as practical from the incident scene, especially in case of fire. • If medical attention is needed, assist in arrangements for medical assistance. • The medical personnel will be informed that radioactive contamination might exist on the victims and/or their clothing. • Identify all those who may have been exposed to a possible release of radioactive material. • Identify those involved with the incident or potentially contaminated by the incident at the scene, except those requiring emergency medical evacuation. • All individuals will be monitored and decontaminated. • Record names, addresses, destinations, and telephone numbers of those 	<p>CMG, Dist. Collector, SP, Municipal Commissioner, EOC, Director DMU, Info. Dept., Home Dept., local authority, Health Dept. Civil supply Dept.,</p>
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	<p>individuals who cannot be persuaded to stay at the incident scene.</p> <ul style="list-style-type: none">• Prohibit eating, drinking, and smoking in the incident area.• Advice to the Local Public following a Radiological Dispersal Device Explosion• The public living in approximately twice the radius of the inner cordoned area is advised the following:<ul style="list-style-type: none">○ If present in the inner zone, to get monitored at the earliest.○ Move away from the immediate area○ Not to eat food until certified free from contamination.○ Avoid any smoke/dust.○ Turn on local radio/TV channels for advice from emergency response centres/health authorities.○ Remove contaminated clothes and place these in a sealed plastic bag; Take a shower to wash off dust and dirt. This will reduce total radiation exposure.○ If radioactive material was released, local news broadcasts will advise people where to report for radiation monitoring and for blood and other tests to determine whether they were in fact exposed and steps to be taken to protect their health	
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Sources of Chemical Disasters

Chemical accidents may originate in:

- (i) Manufacturing and formulation installations including during commissioning and process operations; maintenance and disposal
- (ii) Material handling and storage in manufacturing facilities, and isolated storages; warehouses and godowns including tank farms in ports and docks and fuel depots.

Transportation (road, rail, air, water, and pipelines).

Authority

Enforcement and monitoring of chemical safety and emergency Management involves various central/state ministries/departments viz. Ministry of Home Affairs (MHA), Ministry of Environment and Forests (MoEF), Ministry of labor and Employment (MoLE), Ministry of Agriculture (MoA), Ministry of Petroleum and Natural Gas, Ministry of Chemicals and Fertilizers (MoC & F), Ministry of Shipping, Road Transport and Highways (MoSRT & H), Ministry of Commerce and Industries (MoC & I), DEA, Ministry of Finance (MoF) etc. The MoLE, MoEF and MoSRT & H handle enacting regulations.

At the State Level

At the State level, the State Crisis Group (SCG) is an apex body to deal with major chemical accidents and to supply expert guidance for handling them. The same existing and established structure could be used for handling Chemical Disasters also SCG, under the Chair of Chief Secretary.

At the District Level

At the District level, the District Crisis Group (DCG) is an apex body to deal with major chemical accidents and to provide expert guidance for handling them. The same existing and established structure could be used for handling Chemical Disasters also. The DCG includes District Collector, SDM and Dy. Collector, DDO, Dy. Director – Industrial Safety & Health, DSP, PI, Fire Superintendent of the City Corporations or important Municipalities, Chief District Health Officer, Civil Surgeon, SE, Chief Officer, Dy. Chief Controller of Explosives, Commandant – SRPF, Group-I, Dy. Director – Information to name a few.

Flow of Information (Communication)

A procedure must be laid out to communicate the accident / attack to the District Control Room (DCR) giving details such as location of incident, chemical(s) involved, severity of incident, casualties (if any), etc. The person in-charge at DCR shall then inform the first three responders i.e., Police, Fire & Emergency Services and Medical Department. He will then inform the District Collector and all other members of the DCG. The District Collector, in turn, would inform the Maharashtra State Disaster Management Authority (MSDMA) and the SCG about the incident and ask for additional help in terms of resources and workforce (if at all required) after assessing the situation on site. The SCG or the MSDMA would then inform the Central Crisis Group (CRG) about the incident along with other relevant details on hand. The first responders, after reaching the site, will secure more information about the incident and try to establish communication with the concerned agencies / departments for deploying resources / personnel as per the need of the situation.

Regulatory Framework

The regulatory framework on chemical safety can be traced to the Factories Act, 1948 and chemical class-specific regulations like the Explosives Act, 1884; the Insecticide Act, 1968; and The Petroleum Act, 1934. Later, an umbrella Act, the Environment (Protection) Act, 1986, was enacted, which also deals with chemical management and safety. A number of regulations covering safety in transportation, insurance, liability and compensation were enacted thereafter. The Government of India has further reinforced the legal framework on chemical safety and management of chemical accidents by enacting new rules and by way of amendments to them.

Trigger Mechanism for Industrial (Chemical) Disasters

On getting the firsthand information about an emergency/disaster, the in-charge of the DEOC should immediately inform the District Collector and the first three responders i.e., Police, Fire & Emergency Services and Medical Services. The informed District Collector then runs down to DEOC, where Dy. Director of Industrial Safety and Health (DISH) and two experts will join him. The notification should specify the location of the incident, the type of chemical released/used (if known), possible consequences and provide written reports on actions taken and on health effects. The District Collector should then inform the State Control Room (SCR)/SEOC, the MSDMA and the Chair of the SCG about the incident. The SEOC will then issue an alert or direct all the Emergency Responder Agencies at the State and District level to supply their services at once. The SCR/SEOC will at once decide to deploy SRTs in the affected areas.

During the initial stages of the emergency, it is likely that the reports may be unclear and conflicting. Therefore, the first responders conducting the on-site assessment should secure reliable sources of information to allow an objective assessment of the situation. The assessment should include casualty, material damage, and the likely health consequences.

It should also suggest antidotes and treatment regimens for those affected by medical care if the type/nature of chemical released/used during the attack is known. The State Crisis Group (SCG), after analyzing the information received from the District Collector and the first responders would then decide on mobilization of added resources, medical aid and rescue equipment as needed through various sources. The SCG should also instruct the Fire & Emergency/Rescue Services and Hospitals of the neighboring districts to be on alert in case their services are needed. The Team Commander of the ERT should cordon off the affected area. He should instruct the neighboring population to stay away from the site. He should instruct the medical unit to detect the substances used during the attack through the available equipment/kit. He should also decide the place for establishing the decontamination unit at an appropriate location in consultation with doctors and paramedics. The

Search & Rescue unit of the ERT should rescue and evacuate the affected people to a safe location.

Response for Industrial (Chemical) Disasters

Response measures are those which are taken instantly prior to, and following, an Industrial (Chemical) emergency/attack aimed at limiting injuries, loss of life and damage to property and the environment and rescuing those who are affected or likely to be affected by it. SCG will ensure that the functions and responsibilities of the chemical facility operators and response organizations are clearly defined and understood by all stakeholders. The Central Crisis Group (CCG) and the SCG/DISH will also determine the actions that need to be performed by each organization during an emergency and whether it has the necessary resources and capabilities needed for the purpose.

For the fastest response, it is very important that the person who is receiving the information should immediately pass it on to the first responders, Dist. Collector, Sub Div. Magistrate. If he receives further information after making the first call, he will convey that also in the same order. Alternatively, if the information is more relevant to any department, he will first pass that information to its head. The specific activities and role & responsibilities are as under;

Task	Activity	Responsibility
Declaration and Plan Activation	<ul style="list-style-type: none"> • In consideration with SCG declare an off-site emergency and activate an off-site emergency plan. • Activate DCG. • Establish immediate communication with DEOC, SEOC, and SDMA 	Collector
Deployment of SAR and First Aid Teams	<ul style="list-style-type: none"> • Deploy the Emergency Response Teams of Fire, Police, S&R, and Medical in affected locations immediately. • Evacuate the affected/likely to be affected people to safer places and arrange temporary shelters and medical assistance for them. • Deploy the SAR and First Aid teams including doctors, nurses, triage officers and paramedical staff in affected areas with all medical equipment and critical supplies. 	Collector, Municipal Commissioner, Home Dept., Health Dept., Industry/Industrial Association,

	<ul style="list-style-type: none"> • Keep people in temporary shelters until the affected areas are cleared and declared safe. • Coordinate with State Authority for necessary arrangement in affected areas. 	
Addressing Health related issues	<ul style="list-style-type: none"> • Ensure sufficient stock of emergency medicines, antidotes, etc. in all hospitals at district and taluka level. • Keep all hospitals in a ready position with workforce and medicines to address any emergency. • Ensure that the required medical assistance/aid and medicines/antidotes are provided to the affected people at site as well as at evacuation/relief centers in the affected area and area and necessary records are maintained. • Contact the State authority for any additional help like doctors, medicines, equipment etc. • Mobilize doctors/paramedics If required, from one district/taluka to other. 	Health Dept
Media management	<ul style="list-style-type: none"> • Make provision for dissemination of accurate and reliable information to the public and media in case of a chemical attack. • Ensure that the information to media/general public about the coordinated response is released in an organized and timely manner. 	Director DMU, Collector, Commissioner of Info., Municipal Commissioner
Disposal of Dead bodies	<ul style="list-style-type: none"> • Ensure following procedure is followed before disposal/ handing over of dead bodies: <ul style="list-style-type: none"> ○ Photographs of the dead bodies are taken 	Revenue Dept., Collector, Home Dept., Health Dept., Local Authorities,

	<ul style="list-style-type: none"> ○ Identification of the dead bodies is done ○ Postmortem wherever necessary and possible is carried out, ○ Handing over dead bodies of persons known/ identified to their relatives, ○ Disposal of unclaimed and unidentified dead bodies 	Industry/Industrial Association
Animal Care and disposal of dead bodies	<ul style="list-style-type: none"> ● Animal Husbandry Department to ensure medical aid to cattle that are injured. ● Disposal of animal carcasses with the help of local bodies/health dept. 	Animal Husbandry Depts., Local Authorities, health dept.
Resource mobilization and security	<ul style="list-style-type: none"> ● Ensure that evacuation/ relief centres have sufficient food, water, medicines, clothes, blankets, lights, and sanitation facilities and are running with regular supervision of district administration. ● Ensure that the collection and distribution of relief materials are systematic and transparent. 	Secy. R & R, Civil Supply Dept., Collectors, Municipal Commissioner,

- The Secretary, Home and DGP will report to the SEOC at once upon the receipt of information about the disaster.
- The DGP will set up contact with the District Police Control Room at once. He will get a situation estimate and assess the operational requirements for the police.
- The DGP will issue an alert to the Dy Inspector General and the surrounding districts. He will direct all the police officials and forces in adjacent Districts to be deployed if necessary. The DG will ensure that the police forces needed for traffic management, evacuation and law and order are available with the district administration.
- The DGP will review the dissemination of warning and the need for evacuation. He will help the Fire & Emergency Services and the Deputy Director, Industrial Safety and Health with Police Wireless sets, so that there is continuous communication among the first responders in an emergency.
- The DGP will ensure that the police force will not enter the area under

disaster without the permission of the Fire & Emergency Services and Health officials.

- In case of big explosion and fire, the DGP will assess the situation and suggest a Plan of Action based on his assessment of the immediate causation.
- The DGP will order deployment of the police force for evacuation of the people from the zone of the danger.
- The DGP will send instructions for the cordoning of the area. People should not be allowed access anywhere close to the site of the disaster.
- The DGP will review the traffic management in the area. The primary aim would be to ensure the transport of the injured to the hospital, easy access for emergency responders and safe evacuation of the people from the danger zone.
- The DGP will also issue directives that all the Private and Public Transport (trains and buses) be diverted from the disaster area.
- The DGP will contact the DIG and ask him to organize the deployment of police force from other Districts, based on the need assessment. The DGP will also contact the Central Industrial Security Forces, and other paramilitary forces to seek their deployment, if needed.
- The DGP will supervise law and order situation. He will take all possible precautions to ensure that public order is kept, and no one takes undue advantage of the situation.

Fire and SAR (Fire and Emergency Services (F&ES), Municipal Corporation, MIDC)

- Reach the site as soon as possible and assess the situation. (Information about the chemical leak/spill, the action taken and status)
- In case of fire, start firefighting with suitable media and take care of surrounding storages/tanks to be overheated to reduce the chances of further spreading.
- In case of chemical leak, try to stop the leak.
- Secretary, Industries will coordinate redeployment of MIDC Fire Tenders from other places, as required.
- Secretary, Industries will also coordinate with the Private and Public Sector industries for deployment of their Fire Brigades to the disaster site.
- The SCG, in consultation with the District Collector and other local officials will ensure that Chief Fire Officer, Fire Services, Dy. Director - Industrial Safety and Health, Officer in charge Police and Health Personnel all work closely with full coordination.
- Mumbai, Pune, Nashik, Nagpur and Aurangabad are the main providers of Fire Services in the state. The District Control Room will decide upon the deployment of Fire Services, based on distance and accessibility.

- Search and identify the risk and nullify the sources of leak / toxic release. If any unclear or unidentified substance or source is found or detected, the team should send them at once to the laboratory for further investigation / analysis.
- To search and evacuate the affected population from the site of the incident.

Medical Services (Dept. of Health and Family Welfare)

- The Secretary - Health, and emergency medicine experts will provide the necessary expertise and specialized services to the SCG.
- The SCG will consider the level of exposure on the basis of situation estimate received from the district administration. It will consider the intrinsic toxic potential of the chemical, its concentration, the duration of exposure, and the health status of the people exposed.
- Based on the information upon the level and extent of contamination, the SCG will decide on the issue of alert and warning to the people in the affected areas through the All India Radio, Doordarshan, and Cable TV.
- The SCG will contact the Civil Surgeon and the District Health Officer of the concerned district and ask them to deploy all the necessary medical facilities including doctors, nurses, medicines, and ambulances.
- The SCG will alert major hospitals in the area and ask them to be in readiness to receive patients.
- In case the nature of contamination requires much greater intervention, the SCG will inform the CCG and ask for the necessary medical assistance of experts, doctors, and equipment. The relevant agency for emergency medicine in the Government of India is the Directorate General of the Health Services (DGHS) in the Ministry of Health and Family Welfare. The DGHS has set up the Emergency Medical Relief cell, to deal with these contingencies.

The SCG will review the diagnostic support services: clinical laboratory, blood banks, radiology, pathology, pharmacy, paramedics, Red Cross, NGOs, and volunteer personnel. It will seek all the steps to organize the necessary medical help through the deployment of doctors, paramedics, and provision of blood and medicines, as required.

The SCG will review the administrative support required for the situation, which includes communications, transport of the victims and of the personnel, feeding of the personnel and patients, and supplies.

- The SCG will collect information on the number of deaths and persons injured, the nature of injuries and the likely long-term consequences.
- The SCG must assess the medical needs of the area on the basis of likely long-term consequences and take steps to equip local medical facilities for

treating people on a long-term basis. The SCG must also make financial provision for spending on long-term treatment.

Responsibilities after the disaster

Once the situation at the site is under control, fire has been extinguished; the emission of vapors to the atmosphere has been effectively checked, the following actions have to be performed by various sub-teams of the SRT and the respective line departments as well as the district administration:

Search & Detection of Leak / Toxic Release - The Search & Detection Team would find the risk and nullify the sources of leak/toxic release. If any unclear or unidentified substance or source is found or detected, the team should send them at once to the laboratory for further investigation / analysis. The Team should also preserve the samples from the site of the incident, such as sand, water, air and other infected substances, for further investigation, which could help strengthen the case later. The technical ability of Maharashtra Pollution Control Board, Fire & Emergency Services and the Health Department may be used by the Search & Detection Team in carrying out the activities if needed.

Structural Inspections after Fires or Explosions - A major explosion could damage or destroy numerous buildings and any nearby bridges or tunnels. Similarly large fires can have major effects on buildings and other infrastructure facilities over a vast surrounding area. In either case, residents / owners of the partially damaged buildings will want to know if the structures are safe to occupy while they await repairs. Questions pertaining to the safety of highway or railway bridges must also be resolved quickly to avoid traffic complications. It must be ensured that the inspection personnel have special precautions (i.e., chemical protective gear) in addition to normal safety equipment in those cases where the structure may still be contaminated by hazardous residues. Fire & Emergency Services personnel along with the structural experts from the PWD Department shall be responsible for inspecting the structural integrity of damaged buildings, bridges, or other structures in the aftermath of a fire or explosion.

Search, Rescue and Evacuation - After getting the go ahead from the technical personnel responsible for ensuring structural safety of the buildings in and around the incident site, the Search & Evacuation Team should carry out their job and evacuate the affected population from the site of the incident. They should brief the Information Officer about the rescue and evacuation status (including the place of temporary shelter) to ensure that no rumors are spread to avoid any panic amongst the general public. The Team, with the help of Police personnel should also stop general public from moving towards the danger zone. The Team should provide guidance to people regarding evacuation routes, first aid and decontamination areas. They should also help the Medical Team in rushing the victims to nearby hospitals.

Post-Incident Testing for Contamination - The De-contamination Team would be responsible to decontaminate the affected area, population, members of the SRT and equipment used during the operation on the site of the incident. In addition, the Team should also be responsible for erecting the decontamination chambers for the affected population. After the operation is completed in all respects, the Team should ensure that the site is totally decontaminated from toxic substances. The Team should also ensure that the water that was used for decontamination is properly discharged, preferably to a sewerage system outlet. Technical personnel from the MPCB, Fire & Emergency Services and the nearby industrial units as well as the personnel from the Medical Team should help the De-contamination Team to carry out their duty. Further, the Team shall also check crops, water (ground & surface), homes, stored foods, and animals for possible chemical contamination.

Providing Medical and First Aid to the Victims - The Medical Team should provide first aid to the victims of the incident. If need arises, the Team should also help the hospital staff of the hospital where the victims would be transported from the incident site. They should monitor the level of triage of the victims through checking their breathing and pulse. They should also decide on the type of decontamination (either wet or dry) depending upon the substances / chemicals used during the disaster. The Team should also identify the trauma cases and counsel them appropriately.

Provision of Alternate Water Supplies - There are several circumstances under which a potable water supply may become unfit for human consumption for a time and require replacement. This is most accomplished by bringing in supplies of bottled water and / or tankers / trailers capable of carrying water. The district administration must ensure the availability of potable water for consumption of affected population as well as first responders engaged at the incident site.

Re-Entry Into Evacuated Areas - Based on the assessment of the situation at the site, the DCG would take a decision on the termination of emergency. However, before taking this decision, several other actions need to be ascertained such as restoration of electricity, gas, and water supplies in the affected areas / buildings, transport arrangements for bringing the affected population back from the temporary shelters, restoration of law & order in the affected area /s, etc. through the concerned Teams / departments.

Responsibility of the other Statutory Authority - The designated authority under various statutes like Indian Boiler Act, Factory Act, E.P. Act, Explosive Act, Static and Mobile Pressure Vessel Act etc. shall perform post emergency activities prescribed and as directed by District Collector under Maharashtra State Disaster Management Authority.

CHAPTER 8: LIVESTOCK CARE IN DISASTERS

8.1. Livestock Care during Disaster

Natural disaster is an event that is responsible for social, economic, cultural, and political devastation and affects people and communities at large. During natural calamities attention usually goes primarily towards human welfare, however, welfare of animal is also of paramount importance considering their causalities from drought and flood prone diseases, epidemics, and different feed poisoning. Livestock rearing in the State is a source of employment for many more people. Nevertheless, grave implications of natural calamities on both the livestock and their owners, disaster management of livestock has yet to receive any serious attention in India.

Issue to be taken in consideration: Prevent flooding, fire or earthquake from harming livestock: Safely transport, communicate and obtain medical assistance for livestock in disasters: evacuate, feed and identify livestock in a disaster: take steps to ensure that animal-related business fully recovers from a disaster: apply the four phases of emergency management to the care of livestock in disasters.

The care of livestock

Many farms are vulnerable to natural disasters and require special consideration in the protection against disasters. Their owners depend on the farm's income for their livelihood. There are often many chemicals, such as fertilizer, herbicides and pesticides that can be spilled in a disaster. In this section, you will learn about some of the basic principles of disaster mitigation for livestock.

Farms in disasters are of concern for many reasons, some of which are listed below:

- The safety of the human food supply depends on the health of food-producing animals: Owners have personal and financial investments in their animals.
- Farm owners may be injured or killed attempting to rescue their animals in disasters.
- For many States and businesses, livestock, poultry, and horses are a vital source of revenue.
- Protecting and saving human life is the priority of disaster relief.

Protecting property is of secondary concern. Because of this, emergency management officials are not trained to deal with animals as property or the restoration of animal-related businesses. Therefore, farm owners should work with their emergency management agency and other groups before a disaster. Though, they should remember that the care of and responsibility for all animals lies with their owner or designated care provider.

8.2. Mitigation

There are many things that can be done on farms to mitigate disasters. Some of these are listed below.

Build and repair buildings to meet or exceed construction codes and consider ease of evacuation.

- Replace or cover glass windows with materials that will not shatter and injure animals or personnel.
- Make sure that drainage ditches have grass covering (maintain sod): prevent ground-burrowing animals from damaging dams and levees.
- Avoid accumulating piles of trash that can spill onto other persons' property and injure animals and people.
- Store chemicals in stormproof buildings and secure containers.
- Do not leave construction materials unsecured. In high winds, these may become projectiles.
- Drain or build levees around ponds that could flood.
- After evacuating the barn, always close the barn doors to prevent animals from running back inside the barn.

Flooding

Many farms are in floodplains, but some farm owners and managers have a false sense of security. The animal husbandry department can provide maps and flood risk assessment information on every property in their State. Farm owners should gather this information, review the location of their property, and engineer access to their property so that it will not leave them stranded during flooding. Civil engineers can help in the design and construction of flood-protected farm accesses and make recommendations on suitable locations for barns, stables, paddocks and high-lying areas that may be used as pasture ground in the event of a flood.

A common aftermath of flooding is the overflow of manure pits and waste lagoons. This can contaminate the environment, rivers, and the drinking water supply. If this occurs, the environmental department will be interested in the environmental impact and will be concerned with river contamination and potential fish killings. Farmers can be fined for violations against regulations of environment departments. To prevent this from happening, farmers should take the following precautions.

- Have lagoons regularly inspected.
- Diligently keep records on the impact lagoons have on the environment and water shed.
- Discuss plans to divert manure from streams and rivers

Another frequent problem on farms in disasters is hazardous materials spills. Storing hazardous materials in locked buildings with securely strapped containers should prevent these from leaking into the environment and water supply.

After floods there may be an increase in infectious disease.

- Animals that have stood in contaminated flood water will be at increased risk and may develop infections of the hooves and skin (dermatitis).
- Cuts acquired from disaster debris make animals more susceptible to tetanus and contaminated floodwater may contain toxins, including botulinum toxin from rotting carcasses. Contact with wildlife may also increase the potential for rabies.

Fire Safety

Barn fires tend to break out in the winter and summer months when barn doors are closed and the demand for heating, cooling (fans) and lighting is at its highest. Many livestock facilities are built of flammable materials, and some contain gas heaters. Safety measures to prevent the damage caused by fires include the following.

- Fire extinguishers, sprinkler systems, smoke detectors and enforced no smoking policies can greatly reduce the risk of fires.
- Electrical wiring of barns and stables should meet appropriate safety standards and be installed by qualified electricians. Professional advice is available to help with this.
- The State department of building and fire safety and most local fire departments provide low-cost inspections and recommendations on fire safety for properties. The recommendations are detailed and will provide the highest standards by which to prevent fires.
- Farm owners should consult with their local fire department on how to fireproof their stables. This also familiarizes farm owners and local fire fighters with one another. This familiarity is helpful in case of an emergency. Knowing where a farm is located, how to access facilities, how many animals are there, and where large volumes of water are available can make a difference when firefighters are responding.

Power Supply and Miscellaneous repairs

Priority for restoration of power following an emergency is usually based on human population density. Because many farms are in rural areas, it could be some time before power is re-established. Many livestock operations depend heavily on electrical power to milk cows, provide heat and cool air (fans), and operate feed elevators and machinery. Owners can find out about the relative priority of their farm from their local utility company. This important information can

help farmers prepare for times without power. Farm owners should consider securing a generator for emergencies.

8.3. Preparedness

The priorities for disaster planning for farms varies to some extent with the type of animals and facility. In general terms, the greatest priorities, i.e., the most likely disasters to occur, are trailer accidents, floods, fires, power outages and contagious disease outbreaks. Some locations will have additional hazards to consider, such as high winds, landslides, and hazardous materials. Owners should consult their local livestock officers and take necessary suggestions.

Safety in Animal Transport

Transportation accidents are one of the most common disasters that livestock owners will encounter. Preventive measures include regular inspection of trailers and two vehicles for safe operation.

Veterinary preparedness in disasters

The priorities in veterinary care vary with each disaster.

- In high winds, tornadoes and hurricanes, traumatic injuries will predominate.
- In droughts and in severe winter weather, starvation and dehydration may be problems.
- Following fires, smoke inhalation and burn wounds will be issues that require veterinary attention.

Many disasters also have distant effects on animals, e.g., debris on pastures many miles from a tornado touchdown and moldy corn following a flood can be a problem after a disaster. If you are concerned about diseases that may result from a disaster you should consult your veterinarian. If animals die or have to be euthanized, it is recommended that a post-mortem examination be performed so that insurance and legal claims can be settled.

In disasters, farm animals may be forced to congregate. Livestock from several farms may mix resulting in contagious diseases. Be aware that changing social structure may result in aggressive behavior leading to injury. Some measures can safeguard the health of livestock in disasters — vaccinations, deworming, and Coggins tests for horses.

Before Disaster Strikes

Recommended items for a livestock disaster box include:

- Tack, ropes, halters

- Concentrated feed, hay, supplements, and medicines
- Copies of ownership papers
- Buckets or feed nets
- Flashlight or lantern
- Blankets or tarps
- Lights, portable radio, and spare batteries
- Livestock first aid supplies

Additional Recommendations

- Consider the following prior to floods, cyclones, fires, blizzards, and other natural disasters.
- Learn what disaster risks are prominent in your area and what conditions accelerate that occurrence.
- Contact local law enforcement and emergency response agencies and familiarize yourself with their response patterns, criteria, and capability. Make sure you also contact the official in charge of disaster response.
- Visit with neighbors or local groups about organizing a management or evacuation system for livestock.
- Evaluate your own handling capabilities including workforce, equipment, and alternatives.
- Contact friends or families and make emergency arrangements with them for temporary livestock care.
- Identify facilities and resources that may be available 15 to 40 miles from your site. This works well with agricultural producers and stables for the same contingency.
- Make sure you have legal and adequate markings to prove ownership of your livestock. Consider having ID tags (such as luggage tags) on hand that you can attach to any animals that are half broken. You might consider having livestock marker crayons or bright-colored paint convenient to mark your animals and your premises. For less domesticated livestock you may be dependent on brands, ear tags, and ear notches. Have individual and group photographs of all livestock in your livestock *disaster box*.
- Practice loading your animals, so you and the animals are familiar with the effort.
- Monitor television and local radio broadcasts regularly if risk factors are present.
- Identify an alley, lane or pen that can easily be used to confine animals and is readily adjacent to where a trailer or truck can access them.
- Utilize cell phone technology to monitor neighbors, families, and livestock.

8.4. Response

Evacuation

Farm evacuations present unique problems. Appropriate planning is essential. Evacuations are best coordinated with neighbors, friends, and neighbors. Both the destination and the method of transport need to be sorted out well in advance of any need.

Feeding

When livestock and horses are evacuated and housed in large numbers, adequate amounts of feed may be difficult to procure.

- Develop lists of feed and hay suppliers in your area.
- Avoid dietary changes. When the diets of horses or livestock change, they become predisposed to colic, laminitis, and metabolic diseases.
- Feeding diets that have moderate energy levels and meet the minimum nutritional requirements reduces the likelihood of illness. Use the following table to judge how much water and feed your animals may need.

Identification of Animals

In large-scale disasters when many animals are evacuated, identification of the animals and their owners is difficult. Ideally all animals should be uniquely and permanently found. Consider that identification serves two purposes: the owner can positively find their animal; and others can trace the owner.

Horses can be permanently found by microchips, freeze marking or tattoos. Owners should have current front and side view photographs. However, when this is not the case, e.g., when livestock and horses must be evacuated suddenly, emergency identification methods can be used. These include:

- Painting or etching the hooves,
- Body marking with crayon,
- Clipping phone numbers or farm initials in the hair,
- Neck banding,
- Identification tags on halters, and
- Glue-on numbers.

Hazardous Materials

During floods, following cyclones and earthquakes, hazardous materials can be knocked over and contaminate the environment and animals. While farmers are often qualified to handle hazardous materials commonly used on their farms, farm owners should be aware that proper training and hazardous materials certification

are required to deal with releases and the potential contamination of the food supply. Untrained persons should not deal with hazardous materials at all.

8.5. Recovery

Farms are traditionally concerned with restoring the animal industries following a disaster.

- The long-term recovery phase of a disaster can be protracted, with substantial adjustments occurring in the disaster-stricken community.
- Restoration of businesses is facilitated through low-interest loans supplied by local banks. Businesses with appropriate insurance coverage are most likely to have the best recoveries.
- Farms often have special claims programs for recovery from disasters — farmers should pay special attention to these and consult their emergency management officials and county extension educators on what is available. In the past, farmers have been unaware of the sources of funding available to them to help recovery.

8.6. Relocation

Every farm owner should have alternative accommodation planned for their animals in the event of a disaster. These contacts should be confirmed at least once per year. Be sure when selecting facilities to choose those that will not likely be affected by the same disasters you are planning for. Consideration should be given to how enormous amounts of manure will be disposed of — this will accumulate and pose a significant animal and human health problem. Plans should be made for disposal of carcasses.

Restoration of Farms as Business

Farms are often affected by local disasters, such as fires, floods, chemical spills, and cyclones. It is estimated that only a few small businesses affected by a major disaster ever recover to a functional state. This is likely due to inadequate insurance coverage. Farms without sufficient records will have a challenging time making an adequate insurance claim. Major concerns for small businesses, including farms, in disasters include the following.

- Personnel,
- Cash flow,
- Continued income for employees,
- Continued provision of quality care for animals,
- Restoration of a functional business,
- Changes in community infrastructure, and
- Customer, buyer, and supplier loyalty.

Many of these issues can be addressed before a disaster by obtaining adequate insurance coverage and entering into agreements with neighboring farms to share facilities and resources.

In addition, farms may obtain assistance from local banks, insurance companies, animal husbandry department, agriculture department and forest department to recover.

CHAPTER 9: SOCIAL INCLUSION IN DISASTER RISK REDUCTION

9.1. Gender issues in Disaster Management

The relationships between men and women are powerful forces in every culture. The way these relationships are defined creates differences in the roles and responsibilities of men and women. It also leads to inequalities in their access to, and control over, resources and decision-making powers. Women and girls generally tend to be the main victims of natural disasters. A few commonly recorded reasons for higher death tolls among women and girls include:

- Cultural constraints on female mobility which hinder self-rescue, for example, women may not leave the home without male permission, they may be reluctant to seek shelter because shared communal facilities do not have separate, private spaces for women or clothing may have been damaged.
- Lack of skills such as swimming or tree climbing, which are traditionally taught to males.
- Less physical strength than males, in part due to biological differences but, in some cases, also because of prolonged nutritional deficiencies caused by less access to food than men and boys.

9.1.1. Women

Inclusive Disaster Risk Management is about equality of rights and opportunities, the dignity of the individual, acknowledging diversity, and contributing to resilience for everyone, not leaving aside members of any community based on age, gender, disability or other.

Article 15 (1) of the Indian constitution states that “The State shall not discriminate against any citizen on grounds only of religion, race, caste, sex, place of birth or any of them” It is not just a negative barrier on prevention of discrimination. It entails the State to take positive action to ensure equity and inclusion for all segments of population.

The Disaster Management Act, 2005 further reiterates this constitutional prohibition against discrimination by stating specifically that “While providing compensation and relief to the victims of disaster, there shall be no discrimination on the ground of sex, caste, community, descent or religion”. (Section 61).

The preamble of the National Policy on Disaster Management (NPDM) 2009 notes that the economically weaker and socially marginalized sections, women, Scheduled Castes, and Scheduled Tribes tend to suffer more during disasters. The Sendai Framework for Disaster Risk Reduction (SFDRR) 2015 – 2030 calls for an ‘all-of-society approach’ that is people-centric and inclusive.

9.1.2. Children

As per the 2011 census, 128.48 lakhs children in Maharashtra are in the 0-6 years age group, constituting 11.43 percent of the state's total population. Further, projections from United Nations Population Fund (UNFPA) report are as follows for year 2011.

Age group	Percentage
0-4	99.3
5-9	97.98
10-14	102.69
15-19	105.81
Total	405.51

Children in DRR planning: The United Nations Convention on the Rights of the Child adopted in 1989 (UN (United Nations) 1989) became the first legally binding international convention to affirm human rights for all children. It stipulates that children have the right to adequate food, water, shelter, and education. In disaster situations they ought to be free from abuse, neglect, sexual exploitation, or trafficking, and should be able to grow up in a safe and supportive environment. Children are vulnerable due to their age and immature psycho-social understanding of the surrounding.

The needs of disaster affected children have been undermined so far in disaster management planning. However, disasters can cause severe threats to life and the overall development process of children. Lack of addressing their needs will put more children at risk such as children being left out from schools due to infrastructural damage, reduced nutrition due to lack of resources, new-born and children under five are at increased risk of water and vector-borne diseases. Further, children belonging to socially vulnerable groups such as SCs, STs, OBCs are further at large risk of being affected due to disasters. There are even more grave consequences when the vulnerabilities intersect such as age, gender, social group, economic status.

The JJ Act, 2000 provisions for care, protection and rehabilitation of children ensuring setting up of Child Protection Units. Such units must be set up at village and block level so that children have access to nutrition, child friendly spaces for recreation, protection against violence and trafficking, restoration of children to their biological families, promote community-based rehabilitation of the orphan and children of single parent not in a position to provide care and protection making use of State specific foster parent support services/ schemes.

Therefore, the State Disaster Management Plan in coordination with other line departments needs to develop a holistic approach for safety of children and implementing strategies with knowledge partner so as to reducing their exposure to

risks and disasters and ensure a safe future. The outcome should be to increase children's resilience by improving their capacity to assess and manage disaster risk. Consulting with children to ascertain disaster risks, issues and needs and include them in the planning process. Additionally, including child centered risk assessment and risk reduction through incorporation into planning, designing and implementation stages of state, district and regional development programs is essential. Additionally, strengthening health infrastructure and services including PHCs, CHCs, government hospitals, developing school safety plans for all schools with special focus on remotely located institutions are few key steps to ensure that vulnerabilities associated with children are addressed.

9.1.3. Elderly

Disasters affect all, however older adults can become especially vulnerable due to a range of challenges associated with old age-related health affecting their mobility, access to shelter, health services and nutrition. According to the 2011 Census, 9.9 million persons in Maharashtra are enumerated to be above 60 years of age. Of them, 4.7 million are men and the remaining 5.2 million are women, with the majority residing in rural areas. Further, in terms of the population composition of the state, over 10 per cent is comprised of persons aged 60 and above, which is higher than the national average of 8.5 per cent. Similarly, the proportion of the elderly in the age group 80 and above (oldest-old) in Maharashtra is higher than the national average.

According to Helpage India, during disasters the elderly are usually the last in the line, likely to be lost in the crowd, and highly vulnerable. Therefore, greater vulnerability of the elderly compared to others during disasters needs more attention in all phases of disaster risk management. It is imperative that the needs of the elderly population need to be treated as priority group by proper design in the disaster management plans. The DRR planning needs to pay special attention to psychological vulnerabilities, impaired physical mobility, diminished sensory awareness, poor health conditions as well as weak social and economic limitations that severely limit the capacity of the elderly to prepare for disasters, hinder their adaptability and constrain their ability to respond.

The UN Charter 14 (UNISDR 2014) for older people in DRR focuses on three key principles of an inclusive approach to DRR, and there are fourteen minimum standards underpinning them. The three principles are:

1. **In need:** older people have specific requirements which must be understood and responded to within all DRR activities.
2. **Invisible:** Older people's vulnerabilities and capacities are often overlooked; the collection of data on people's age and sex is essential to ensure older people and other people at risk are visible and supported in DRR.

3. **Invaluable:** Older people have years of knowledge, skills and wisdom which are invaluable assets in DRR and must be acknowledged, valued, and engaged by supporting older people to participate in DRR.

9.1.4. Disability

The domains of disability are hearing, speech, visual, mental, locomotor, and others. Persons with disabilities (PWD) are often overlooked and thus not only excluded in risk reduction and disaster response measures but are also subject to higher risk than others. The NDMA has brought out relevant guidelines⁵¹ which must be consulted. Neglected throughout the DRM cycle, concerns about inclusion relate to limited social participation in DRR activities, poor access to information and services, poverty, invisibility during relief operations, response to basic needs not adapted and specific needs ignored.

The UN Convention on the Rights of Persons with Disabilities (UNCRPD) states in its first article: “Persons with disabilities include those who have long - term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others.” The Convention, in its articles 11 and 32, requires that persons with disabilities benefit from and participate in disaster relief, emergency response and disaster risk reduction strategies. The Adoption of the Dhaka Declaration on Disability and Disaster Risk Management, in December 2015, acknowledges: “the importance of linking disability inclusive Disaster Risk Management (DRM) with the Sustainable Development Goals (SDGs) on the understanding that inclusion builds the resilience of the whole of society, safeguards development gains and minimizes disaster losses.”

Further, The Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) was the first major agreement of the post-2015 development agenda which clearly emphasizes the importance of disability inclusive DRR (DiDRR), specifically highlighting the need for empowerment, leadership, and meaningful participation of persons with disabilities in disaster risk reduction related policymaking and practice.

There is a clear need for including the needs of PWDs (Public Works Department) in DRR planning with developing strategies that are aimed at institutionalizing disability inclusive DRR. To make the disaster management plans more inclusive of PWDs the plans must ensure disability disaggregated data during all disasters to understand the impact of disasters on disabled population, include disability inclusive risk assessment in development planning, allocate resources for implementation of disability inclusive plans, and make risk communications disable friendly, direct representation of PWDs in planning process, sensitize and enhance capacity of all stakeholders for so as to enable disable inclusive disaster response, planning and preparedness.

At the same time, gender-based behaviors and stereotypes can also have negative effects on men and boys. Poverty is known to be a key factor in the vulnerability of both men and women during hazard events, but there can be gender differences among poor people that further compound the risks. For instance, poor women may have heightened vulnerability to hazard events that occur during the daytime, as many live in unsafe areas and houses and tend to spend more time indoors and near the house than their male relations. As men usually form most poor migrant labourers, their wives, and children, as well as older people remaining in the family home, may be more exposed to the impacts of local disasters.

In addition to gender-based stereotyping and discrimination, women and men may face further discrimination based on race, ethnicity, age, language, disability, sexuality, class, or religion, further increasing their vulnerability.

9.1.5. Men

It is essential to analyze the capacities, needs, and vulnerabilities for men and women in various ways. Disaster risk management must consider a variety of ways that gender dynamics affect how disasters are felt. Men's workload distribution and stereotypical portrayals of men, harmful masculinity norms for boys and men, their access to pertinent information, and their capacity to process and cope with the trauma of a disaster are among the specific issues to be evaluated. These issues can either have a positive or negative long-term impact on women and girls. Since few frameworks specifically include males, "men-streaming" must be given priority. To identify and analyze gender-differentiated hazards and vulnerabilities (physical, social, economic, cultural, political, and environmental), socially and culturally aware methodologies must be used. NGOs in the area/locality can become involved.

9.1.6. Migrants

In accordance with the information above, males typically leave the country while women stay behind to take care of the family. They primarily experience resource and structural limitations as they leave their homeland. Therefore, it is essential to address the diverse needs of migrant populations so that better policies and interventions may be developed to boost resilience for everyone. The state's Department of Women and child development has created a migration tracking system (MTS) program that uses a website to track the movement of vulnerable seasonal migrant workers. It is possible to scale up this pilot initiative in six of its districts. The database for immigrants working in unorganized sectors must also be kept up to date.

9.1.7. Transgenders & LGBTQ

The efforts to mainstream gender equality, particularly within LGBTQI communities, are not based on requirements related to human rights. In addition to other factors such a lack of sufficient documentation, social stigma is the main cause of this. This

stigma is also present in relation to the numerous calamities or disasters that this group experiences. During disasters, vulnerable communities, such as LGBTQI people, are disproportionately affected. As a result, efforts should be undertaken to train transgender people to administer first aid and prepare survival kits in case of emergencies. Additionally, participants in the conversation will be recruited from the transgender community. Sessions for general training and capacity-building must be held. Making policies more inclusive while considering the needs, capabilities, talents, and contribution of transgender populations to the development of resilient communities.

9.2. Disaster Response

9.2.1. Gender Considerations in Disaster Response

Emergency needs assessment: In quick-onset disasters, rapid assessments normally take place within the first 24 to 72 hours (about 3 days) of the emergency. At the minimum, data should be collected on the age, gender, and diversity of the affected population. Whenever possible, this data should be supplemented with any available information on the pre-existing gender and socio-economic context and on the impact previous disasters may have had on diverse groups.

Emergency response teams: Assessment and response teams should include equal numbers of male and female members to facilitate accessing women and men separately during needs assessments. The proportional representation of, and consultation with, male and female representatives of diverse groups in the affected communities (the elderly, youth, and minorities), is also particularly important for the same reason.

Beneficiary registration and relief distribution systems: Procedures for relief registration and distribution should recognize the need for, and ensure access to, assistance by all types of vulnerable and needy households, as well as individuals within households. Relief materials should not be distributed in the name of only male heads or based on physical damage and losses. Food aid is far more likely to reach children if it is distributed directly through women. However, the system for doing so must be carefully developed with the participation of community and other local leaders to avoid misunderstandings and backlashes against the targeted groups.

Female heads of household or female family members with limited physical mobility may need help accessing distribution locations or may need relief aid transported to them. This may also be the case for the elderly and for those with disabilities. This situation can be compounded when women face multiple mobility constraints. This may require door-to-door visits to those with mobility constraints, as well as consulting men and women separately and scheduling community meetings at times that are convenient for both.

Appropriateness of relief items: Gender and culture-specific needs should be taken into consideration when designing relief packages. Women and men should be consulted on the contents of relief supplies to ensure they are suitable and to avoid costly waste, preferably as part of disaster preparedness planning for the pre-stocking of relief items. Women and older girls also have sanitary needs that should be considered. Relief packages need to contain supplies for menstrual blood absorption that are in line with what women would normally use (sanitary pads and clean strips of cloth) and should include underwear for women and girls. As women tend to be reluctant to approach men regarding their personal hygiene requirements and can be easily embarrassed or humiliated during the distribution of sanitary and undergarment supplies, it is generally preferable that males are not involved in their distribution. Similarly, pregnant, and lactating women have special needs for ensuring adequate milk production and for other crucial nutrients and vitamin supplements that can be incorporated into family or mother and baby assistance packages.

Addressing Health Issues: Disaster relief efforts need to pay attention to specific female health needs. Often, pregnant women have lacked access to obstetric care and have miscarried or delivered babies under unsanitary and unsafe conditions. The availability of female and male medical personnel is particularly important after a disaster. This is especially true when cultural norms may not allow women to be examined by male physicians, and when women's mobility may be restricted.

Ensuring the safety and security of those displaced by disasters is also a key priority. Displaced women and girls face heightened risks of unwanted and high-risk pregnancies and rape. Those affected by disasters also frequently face a higher exposure to contagious diseases including HIV/AIDS. Condoms, reproductive health kits and midwifery kits, along with reproductive health information are key post-disaster needs.

Domestic violence and alcohol abuse prevention counseling should be incorporated into the provision of post-disaster psychosocial services whenever possible. Increased rates of alcoholism and alcohol-related violence are frequent in disaster-affected areas. Men may also need counseling to help them cope with changes in gender roles, i.e., caring for young children after the loss of their spouse. Sports programs for men and women may also be helpful in relieving tensions.

Ensuring Appropriate Safe shelter, Human Settlements and Water and Sanitation: Shelter and human settlement planning needs to consider the socio-cultural and economic needs and preferences of both men and women, as well as safety considerations. Following natural disasters, the threat of physical and sexual violence often increases; this threat is magnified in relief camps.

The location and set-up of shelters can affect both the perceived and actual safety of those displaced by a disaster. Locating shelters close to the original home whenever feasible provides extra safety due to intimacy with the shelter's physical surroundings. Women are normally responsible for collecting firewood and are therefore particularly affected by the security of access routes to these resources. The spacing and design of shelters is important in ensuring adequate privacy for female members of households from neighbors or passersby. Secure doors and adequate lighting can be crucial factors in safety. Cooking, bathing, and toilet arrangements also need to be adequate, safe, and culturally appropriate. This requires participation by both male and female beneficiaries in designing such facilities. Female and male bathing areas should be placed at some distance from each other and near areas with adequate lighting. Whenever culturally necessary, women's bathing and toilet areas should also include a separate area for washing and drying menstruation clothes. Furthermore, kitchens should be adapted to local food preparation customs.

9.2.2. Gender Sensitive Recovery.

Recovery assessment: A full gender analysis should be conducted as an essential component of recovery needs assessments. Following the initial emergency assessment of a quick-onset disaster, a more in-depth assessment of community needs, vulnerabilities, and coping strategies is usually undertaken by the response and recovery operation. This includes the detailed identification of vulnerable groups with special needs within the local context (single parents, orphans, and landless tenants for example). Vulnerability and Capacity Assessments, Participatory Rapid Appraisals, and other forms of social analysis to be used to determine those that are the poorest and most vulnerable within disaster-affected communities with whom they are currently working or plan to work.

As with emergency assessments, ensuring gender balance on the team conducting the assessments is essential to achieving a reliable result.

Housing, human settlements, and water and sanitation: It is vital that women and men from all social and economic groupings in disaster-affected communities actively participate in the design and location of new housing and communal infrastructure, such as water and sanitation facilities and community halls, as well as the repair of existing structures. Many reconstruction programs have resulted in near-empty settlements or the re-creation of unsafe living conditions, because of a lack of understanding of the livelihoods and social needs of the inhabitants. This includes cases of homes that were designed to be safer when the so-called improved features were unacceptable to the beneficiaries due to cultural or practical reasons. Congested kitchen causes smoke hazards to women. Local participation in physical reconstruction should be encouraged. Women should be co-owner of the houses.

Re-establishing livelihoods: The roles women play in contributing to a household's food security or income, whether as family members or heads of the household, need to be understood, and livelihood recovery activities should be designed that meet their needs, in addition to those of the men in the household. This is especially the case when households were already poor, were particularly affected by the disaster, or had their coping mechanisms badly eroded. Women's means-producing activities can include cultivating home vegetable gardens, playing key roles in crop and fish production and marketing, raising livestock, running small businesses such as selling snacks or making cakes and day labor.

9.3. Disaster Preparedness and Mitigation Measures

Disaster preparedness and risk reduction activities: Recovery processes can include disaster preparedness and risk reduction activities that assist in building community resilience towards future disasters. Undertaking these activities during a recovery process is highly favorable, as people currently affected by a disaster are usually highly motivated to learn new ways of protecting themselves.

Community-based disaster risk reduction and preparedness starts by working with communities to map the most significant locally prevalent natural and human-made hazards and to understand their patterns of vulnerability. It is also important to have a strong understanding of community demographics and existing social capital. Much of this information can be collected by undertaking community Vulnerability and Capacity Assessments. From these, communities can devise local ways to manage hazards and reduce their exposure and vulnerability.

9.3.1. Ensuring Gender-Sensitive Disaster Risk Reduction

Physical mitigation works: The gender-related issues involved in the development of physical mitigation works - be it the building of check dams or health clinics, the planting of mangroves, the improvement of the safety of housing and public buildings or other such activities - are like those outlined in the recovery sub-section on "Housing, human settlements and water and sanitation". Women are often not adequately consulted or involved in the selection, design, and implementation of these mitigation activities. Opportunities can also be created for women to be trained in non-traditional areas, such as cyclone-resistant roof construction, which would contribute to both their personal income and community safety.

Early warning systems: Ensuring that vital information reaches all segments of the community is of paramount importance when designing community-based early warning systems. In the past, there have been examples of assumptions that communicating the danger to one part of the community would ensure the passage of the information to all concerned, when this was not the case. Additionally, in some situations where women and other groups had restricted mobility, they were

overlooked. Community-based early warning systems should specifically address this concern.

Information, education, and communication: Taking gender into account when planning the content of disaster preparedness training and designing the training in accordance with the risk profiles of gender groups can be beneficial. For example, the high-risk nature of some courses of action, and the existence of alternate, safer rescue methods may need to be emphasized with men. The methods chosen for information dissemination should also consider gender differences in literacy, mobility, and access to public venues (some women may need home visits by other women), labor schedules (day fishermen or factory workers may only be available in the evening), and general preferences for the means of participation.

Advocacy: Convincing local government officials and community leaders to fully involve both women and men from communities in disaster management activities and decision-making can be challenging. Local government must undertake an advocacy role regarding the needs of these disadvantaged women and men. This diplomatic role can be adopted during DRR, relief and recovery phases. There is a window of opportunity following disasters when there is great humanitarian care and a willingness to eliminate potential barriers so that beneficiaries can have equity in relief and recovery processes. This period can be well utilized to bring about positive change within legislation, community attitudes and values. Finally, identifying a group of advocates for gender inclusiveness among respected local leaders, as well as through groups representing these interests, women's groups, and NGOs for example, can be highly effective. These advocates should be encouraged to educate and motivate their peers on gender issues. The establishment of an advisory committee or working group comprised of these individuals can also help. However, it should be noted that sometimes support is initially required to strengthen the capacity of the interest groups.

9.3.2. Risk Reduction Measures for Disabled Persons

Governments of the Economic and Social Commission for Asia and the Pacific (ESCAP) region gathered in Incheon, Republic of Korea, from 29 October to 2 November 2012 to chart the course of the new Asian and Pacific Decade of Persons with Disabilities for the period 2013 to 2022. They were joined by representatives of civil society organizations, including organizations of and for persons with disabilities. Also in attendance were representatives of intergovernmental organizations, development cooperation agencies and the United Nations system. The High-level Intergovernmental Meeting on the Final Review of the Implementation of the Asian and Pacific Decade of Disabled Persons, 2003–2012, was organized by ESCAP and hosted by the Government of the Republic of Korea. The Meeting marked the conclusion of the second Asian and Pacific Decade of Disabled Persons, 2003–2012, and launched the new Decade.

The Governments at the High-level Intergovernmental Meeting adopted the Ministerial Declaration on the Asian and Pacific Decade of Persons with Disabilities, 2013–2022, and the Incheon Strategy to “Make the Right Real” for Persons with Disabilities in Asia and the Pacific. The Incheon Strategy provides the Asian and Pacific region, and the world, with the first set of regionally agreed disability-inclusive development goals. Developed over more than two years of consultations with governments and civil society stakeholders, the Incheon Strategy comprises 10 goals, 27 targets and 62 indicators. The Incheon Strategy builds on the Convention on the Rights of Persons with Disabilities and the Biwako Millennium Framework for Action and Biwako Plus Five towards an Inclusive, Barrier-free and Rights-based Society for Persons with Disabilities in Asia and the Pacific.

The Incheon Strategy will enable the Asian and Pacific region to track progress towards improving the quality of life, and the fulfilment of the rights, of the region’s 650 million persons with disabilities, most of whom live in poverty. The ESCAP secretariat is mandated to report every three years until the end of the Decade in 2022, on progress in the implementation of the Ministerial Declaration and the Incheon Strategy.

Out of 10 major goals the disaster risk reduction and management for disabled persons is one.

Goal 7: Ensure disability-inclusive disaster risk reduction and management.

The Asia-Pacific region is the region that is most adversely affected by disasters, including those caused by climate change. Persons with disabilities and other vulnerable groups are at higher risk of death, injury, and added impairments, because of exclusion from disaster risk reduction policies, plans and programs. Public service announcements are often issued in formats and language that are not accessible by persons with disabilities. In addition, emergency exits, shelters and facilities tend not to be barrier-free. Regular participation of persons with disabilities in emergency preparedness drills and other disaster risk reduction measures at the local and district levels could prevent or minimize risk and damage when disasters occur. Physical and information infrastructure that incorporates universal design principles would improve the chances of safety and survival.

Target 1 - Strengthen disability-inclusive disaster risk reduction planning.

Target 2 - Strengthen implementation of measures on providing prompt and right support to persons with disabilities in responding to disasters.

9.4. Indicators for tracking progress Core indicators

1. Availability of disability-inclusive disaster risk reduction plans.

Task	Activities	Responsibility
Provisions for disabled persons in DM Plans	<ul style="list-style-type: none"> • Identification of disabled persons in society, schools, and offices • Identify and include issues for their safety with regard to any disasters in DM plans in school, village, taluka, district and state level 	Education Dept. Revenue Department Zilla Parishad Municipal Corporation

2. Availability of disability-inclusive training for all relevant service personnel

Task	Activities	Responsibility
Capacity Building Trainings	<ul style="list-style-type: none"> • Organize capacity building trainings on fire rescue, emergency exit in case of fire and earthquake to disabled school children, community people and office staff. • Organize training on safe evacuation for disabled persons during disasters 	Education Dept. Revenue Department Social Welfare Dept. Zilla Parishad Municipal Corporation

3. Proportion of accessible emergency shelters and disaster relief sites Supplementary indicators.

Task	Activities	Responsibility
Safe shelters management at disaster affected site for disabled persons	<ul style="list-style-type: none"> • Identify temporary safe shelters before disasters. • Ensure basic facilities with water, food, light, toilets, and sanitation. • Ensure special provision for disabled persons at toilets, walking place, sleeping halls etc. 	Education Dept. Revenue Department Social Welfare Dept. Zilla Parishad Municipal Corporation

4. Number of persons with disabilities who died or were seriously injured in disasters

Task	Activities	Responsibility
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Set up disabled help desk	<ul style="list-style-type: none"> List out the died and injured disabled persons. Circulate the list to concerned government departments. Confirm their identity from relatives 	Health Police Revenue Department
	<ul style="list-style-type: none"> Dispose the dead bodies in consultation with relatives/kins and confirm all formalities that to be maintained 	

5. Availability of psychosocial support service personnel that have the capacity to assist persons with disabilities affected by disasters

Task	Activities	Responsibility
Trauma Counselling for disaster victims	<ul style="list-style-type: none"> Identification of trauma victims. Counselling the disaster victims, especially disabled persons Ensure their regular participation in trauma Centres 	Health Dept. Social Welfare Dept.

9.5. Disaster Mitigation for Persons with Disabilities

Some key principles should guide disaster relief:

1. Accessible Disaster Facilities and Services

Communications technology is vital for people with disabilities during a disaster to help assess damage, collect information, and deploy supplies. Access to appropriate facilities -- housing, beds, toilets, and other necessities -- must be monitored and made available to individuals with disabilities before, during, and after a disaster. This access also must be ensured for those who incur a disability as a result of a disaster. Appropriate planning and management of information related to architectural accessibility improves the provision of disaster services for persons with disabilities.

2. Accessible Communications and Assistance

As communications technology and policy become more integral to disaster relief and mitigation, providing accessibility to the technology for people with disabilities becomes more essential. For example, people with hearing impairments require interpreters, Time-division duplexing (*TDD*) communications, and signaling devices. In addition, written materials must be produced on cassette tape, on CD-

ROM, or in large print for people with visual impairments. People with cognitive impairments, such as those with developmental disabilities, Alzheimer's disease, or brain injury, require assistance to cope with new surroundings and to minimize confusion factors. It is crucial that people with disabilities help develop accessible communications and reliable assistance technologies.

3. Accessible and Reliable Rescue Communications

Accessible and reliable communications technology is critical to ensuring fast, effective, and competent field treatment of people with disabilities. Current satellite and cellular technology as well as personal communication networks permit communication in areas with a damaged or destroyed communication infrastructure. Communications technologies can assist field personnel in rescue coordination and tracking and can be combined with databases that house information on optimal treatment for disabilities or that track the allocation of post-disaster resources.

4. Partnerships with the Disability Community

Disability organizations must join with relief and rescue organizations and the media to educate and inform their constituents of disaster contingency and self-help plans. A nationwide awareness effort should be devised and implemented to inform people with disabilities about necessary precautions for imminent disaster. In the event of a sudden natural disaster, such a program would minimize injury and facilitate rescue efforts. In addition, more young people with disabilities should be encouraged to study technology, medicine, science, and engineering as a way of gaining power over future technological advances in disaster relief and mitigation.

5. Disaster Preparations, Education, and Training

Communications technologies are crucial for educating the public about disaster preparedness and warning the people most likely to be affected. Relief and rescue operations must have the appropriate medical equipment, supplies, and training to address the immediate needs of people with disabilities. Affected individuals may require bladder bags, insulin pumps, walkers, or wheelchairs. Relief personnel must be equipped and trained in the use of such equipment. In addition, relief personnel should provide training, particularly for personnel and volunteers in the field, on how to support the independence and dignity of persons with disabilities in the aftermath of a disaster.

6. Partnerships with the Media

Many natural disasters can be predicted in advance. Disaster preparedness for people with disabilities is critical in minimizing the impact of a disaster. The media -- in partnership with disability and governmental organizations -- should incorporate advisories into emergency broadcasts in formats accessible to people with

disabilities. Such advisories alert the public, provide a mechanism for informing rescue personnel of individual medical conditions and impairments and identify accessible emergency shelters. The creation and repetition of accessible media messages is critical for empowering people with disabilities to protect themselves from disasters.

9.6. Use of ICT in Disaster Management

Communication plays a significant role in Disaster Management in providing information to all stakeholders which would help in SAR, relief, and rehabilitation on activities. Natural Disasters cannot be prevented but their impact can be minimized by using appropriate science and technology tools in managing disasters in a proactive way. It has now been recognized that disaster prevention, mitigation, preparedness, and relief along with environmental protection are closely interrelated with sustainable development. Therefore, mainstreaming disaster management activities in the developmental plans and their effective implementation at all the levels of administration is the key. Information and communication technology would play a key role in bringing all the stakeholders on a common platform to ensure sustainable development.

As per the NDMA guidelines, the State would undertake activities to establish an all-encompassing, integrated, multilateral, reliable, responsive and dedicated state of the art Digital Information and Communication Support Infrastructure on the lines of the National Disaster Management Information and Communication System (NDMICS). Steps would be taken use ICT in HRVA, knowledge management, resource management, early warning system and last mile connectivity creation of relevant database and development of the Decision Support System and also for creating Public Awareness.

CHAPTER 10: BUILDING DISASTER RESILIENCE AND GOVERNANCE

10.1. Introduction

Building disaster resilience and strengthening risk governance are interconnected processes that contribute to resilient development. An informed understanding of existing and emerging risks is the crucial first step. As disaster is both a development and governance issue, assessing and understanding risks have significant implications for both these domains. Maharashtra, being one of the multi-hazard-prone states, needs to carry out a state-wide risk assessment considering all relevant hazards and vulnerabilities, both in terms of their direct and indirect impacts. Important would be, embedding disaster risk assessment and integrating it into the very culture of governance, policy design, planning and investment.

10.2. Thematic Areas of Disaster Risk Management

The NDMP 2019 is right in its observation that disaster risk reduction and resilience building are not just one agency's responsibility. Divisions/Departments across different levels of Government are required to share these responsibilities for sustainable reduction of disaster risks and protecting the gains of development in the long run. As indicated by the NDMP 2019, the State Disaster Management Plan incorporates the following six thematic areas into its resilience framework.

- Understanding Disaster Risk
- Inter-Agency Coordination
- Investing in DRR – Structural measures
- Investing in DRR – Non-Structural measures
- Capacity Development
- Climate Change Risk Management

Understanding Disaster Risks

Hazards are often given; the nature of our exposure to them and what we do about them convert them into disasters. For instance, if most of the state of Maharashtra is in seismic zone III and IV, this hazard cannot be changed; but what can certainly be done is to plan development or other actions in a way that this hazard does not get converted into a disaster. Like we make decisions about where to build schools, factories, dams, and dykes and how much to invest in disease surveillance and we make decisions about how our societies organize and care for vulnerable people and assets. All such decisions can potentially contain elements of disaster risk reduction and resilience building. Hence, understanding and assessment of disaster risk are in fact the first step for building disaster resilience of institutions and stakeholders. A detailed risk assessment helps in identifying risk reduction measures, prioritizing

response functions, updating preparedness plan and informing strategic and policy decision making at all administration levels (Local/District/State). A detailed Multi-Hazard Risk & Vulnerability Assessment (MHRVA) study can direct strategic investment plan for risk reduction.

Disaster Risk Assessment

Vulnerability and risk can be assessed for infrastructure and population through socio-economic survey using the samples of buildings derived from high resolution data along with physical survey of population characteristics and their pattern and temporal distribution. The use of space technology, especially the high-resolution satellite data of Worldview coupled with Cartosat 1, could help in identifying building types in the study area. Maharashtra SDMA will use all the resources available with MRSAC, NRSC, CWC and other technical resource institutions and carry out proper risk assessment across the state by adopting a comprehensive risk reduction strategy.

Inter-Agency Coordination

Inter-agency coordination is a key component of strengthening disaster risk governance. The major themes for action required for improving the top-level inter-agency coordination are a) Overall disaster governance b) Response c) Providing warnings, information, and data and d) Non-structural measures. The State ministries and agencies mentioned are those vested with hazard-specific responsibilities by the Government of Maharashtra or those expected to play major roles.

Nodal agencies/Scientific institutions in Maharashtra document/catalogue disaster events and these databases are maintained and updated on regular basis. Every event feed into better understanding and building of the hazard profile. Information such as population vulnerability due to socio-economic factors, physical vulnerability, accounts of damage and loss are maintained by a range of agencies mandated to deliver sector specific functions. By putting all this information together, the state can develop/undertake risk analysis or risk assessment exercise. The output/information will enable disaster management professionals and communities to undertake prevention/mitigation and preparedness actions.

Investing in DRR – Structural Measures

Undertaking necessary structural measures is one of the thematic areas for DRM and enhancing resilience. The National Disaster Management guidelines mandate integration of measures for prevention of disasters and mitigation into developmental plans and projects including mitigation projects and to facilitate provision of adequate funds for DM. Plans may be shown in three broad categories, viz. short, medium, and long term. These consist of various physical infrastructure and facilities required to help communities cope with disasters. The NDMP further reemphasizes implementation of these measures to enhance disaster preparedness, a component

of Priority-4 of the Sendai Framework. It is also an important component of investing in disaster risk reduction for resilience, which is Priority-3 of Sendai Framework as indicated in NDMP 2019.

Investing in DRR – Non-Structural Measures

Sets of appropriate laws, mechanisms, and techno-legal regimes are crucial components in strengthening the disaster risk governance to manage disaster risk. While the National DM Policy 2009 and Maharashtra State DM Policy put lot of emphasis on this, the Priority-2 of the Sendai Framework and NDMP 2019 also underscore the significance of investing in non-structural DRR measures. These non-structural measures comprising of laws, norms, rules, guidelines, and techno- legal regime (e.g., building codes) provide the legal regime which empowers the authorities to mainstream disaster risk reduction and disaster resilience into development activities.

Capacity Development

Capacity development is a recurring theme in all DRM efforts. National Disaster management Policy, 2009 emphasizes building DM capacities of the institutions and stakeholders. The Sendai Priority-2 (Strengthening DRR governance to manage DR) and Priority-3 (Investing in DRR for resilience) are central to capacity development. The capacity development process comprises awareness generation, education, training, Research and Development (R&D), etc. It further addresses putting in place appropriate institutional framework, management systems and allocation of resources for efficient prevention and handling of disasters. The capabilities to implement, enforce, and monitor various disaster mitigation measures must be improved at all levels from the local to the higher levels of governance. It is also strengthening the DRR governance at all levels to better manage risk and to make the governance systems more responsive.

Climate Risk Management

Maharashtra is extremely vulnerable to climate change. There are definite indications that climate change would increase the frequency and intensity of natural disasters like cyclones, floods, heat waves, and droughts in the coming years affecting the lives and livelihood of people of Maharashtra. To meet these challenges in a sustained and effective manner, synergies in approach and strategies for climate change adaptation and disaster risk reduction shall be encouraged and promoted.

Investments in DRR can play an important role in supporting communities to adapt to climate change. As the impacts of climate change are increasingly felt, more financial and technical resources will be needed to support vulnerable people to adapt to the negative impacts. Planning for DRR must be informed by the likely climate change impacts and scenarios. The state government has recognized that climate change is

a deterrent for the state's development aspirations and undertaken several initiatives to address the issues of change by introducing climate resilient agricultural systems, promoting sustainable farming practices, and providing support to affected communities, promoting energy sufficiency and efficiency, and improving coastal resilience, among other issues. However, there are major knowledge and data gaps concerning climate change impacts, impact scenarios and its effects on various hydro-metrological hazards, which still need to be addressed.

10.3. Disaster Risk Governance

Disaster risk governance refers to the system of policies, institutions, mechanisms, and processes put in place to manage and reduce disaster risks within a society. It encompasses the coordination, planning, decision-making, implementation, and monitoring of activities related to disaster risk reduction and management. Effective disaster risk governance strengthens resilience, reduces vulnerabilities, and minimizes the impacts of disasters.

Strengthening disaster risk governance is considered a cornerstone of the efforts to understand, reduce and manage risks in global practices in DM (UNDP 2015). Good governance also entails improving accountability, transparency and meaningful participation throughout all disaster management procedures, protocols, and practices. Negotiating, building consensus, and reaching agreements comprise both formal and explicit mechanisms (legislation, policies, standards, and administrative procedures) and informal and implicit agreements that mediate social, economic, and political relations. In places where there is a proactive, responsive, and accountable local government that works with local actors, the possibilities of resilience are much higher.

Local Government Leading the Process

Ownership of the DRR and resilience strategy by the local government is essential for its effective implementation on the ground. Hence, special efforts will be made to build the capacities of the local governments (PRIs & ULBs) to help them lead the process from the local level.

Community Engagement

This plan is based on this implicit recognition that communities, being the first responders, their active engagement is critical to having robust DRR strategies and their effective implementation on the ground. It is well established that governments alone cannot address DRR effectively.

Larger ownership of the agenda with vulnerable communities being the primary stakeholders in the process of DRR planning and implementation is the key to the effectiveness of DRR efforts. Several DRR success stories involve planning and

implementation that give central importance to community or civil society involvement. With the support of local PRIs/ULBs, NGOs, academia and/or the private sector, engaged communities would enable priorities to be better defined and actions planned, responding to real (mostly local) needs and concerns and bringing about long-term change.

10.4. NDMP 2019, Sendai Framework and Strengthening Disaster Risk Governance

The NDMP 2019 emphasizes the importance of governance at different levels for an effective and efficient management of disaster risk. Effective risk governance requires clear vision, plans, competence, guidance, and coordination within and across sectors, as well as participation of relevant stakeholders. Strengthening disaster risk governance is necessary to foster collaboration and partnerships for the implementation of disaster risk reduction and sustainable development at the state and local level.

Accordingly, the MSDMP 2023 will strengthen disaster risk governance in the state of Maharashtra through the following measures:

- Mainstream and integrate DRR within and across all sectors and promote the coherence and development of relevant laws, regulations, and public policies.
- It will guide both the public and private sectors through the legal framework that clearly spells out the roles and responsibilities to address disaster risk in publicly owned, managed, or regulated services and infrastructures.
- It must encourage actions by persons, households, communities, and businesses.
- It must enhance relevant mechanisms and initiatives for disaster risk transparency.
- It must put in place coordination and organizational structures.
- Adopt and implement DRR strategies and plans, across different levels (state, district to community) and time scales, aimed at preventing the creation of risk, the reduction of existing risk and the strengthening resilience – economic, social, health and environmental.
- Decentralize and ensure devolution of functions both horizontally (line departments) and vertically (Districts/Talukas/PRIs/ULBs).
- Promote engagement and participation of community in planning, implementation, and monitoring of DRR initiatives to foster community ownership.
- Carry out assessment of the technical, financial, and administrative disaster risk management capacity to deal with the identified risks at different levels.
- Promote necessary mechanisms and incentives to ensure high levels of compliance with the safety-enhancing provisions of laws and regulations, including those addressing land use, urban planning, building codes,

environment, resource management, health, and safety standards, and update them, where needed, for better disaster risk management.

- Develop and strengthen mechanisms to periodically review and assess the progress on various DM plans as well as encourage institutional debates, including by Policy Makers and relevant officials, on DRR plans. Assign clear roles and tasks to community representatives within disaster risk.

The Department of Disaster Management, Relief and Rehabilitation and MSDMA have already developed the Disaster Management Manual which clearly delineates the departmental responsibility chart for managing different phases of disaster management covering preparedness, recovery and rehabilitation and mitigation. However, inter-agency coordination remains an issue and needs to be strengthened.

CHAPTER 11: PARTNERSHIP WITH OTHER STAKEHOLDERS

11.1. National Disaster Management Authority (NDMA)

Government of India has set up the NDMA at national level to deal with all policy and planning issues of disasters. Being an apex body, it has prime responsibility for developing policies, plans and guidelines for disaster management and ensuring their timely enforcement and implementation. The NDMA lays out the guidelines to develop the DM plans at various levels. It approves the National Disaster Management Plan prepared by the National Executive Committee (NEC) and plans of the central ministries and departments. At the national level, any policy related to disaster management comes under the NDMA. Its involvement in every phase of disaster management is important. It takes such other measures as it may consider necessary, for the prevention of disasters, or mitigation, or preparedness and ability building, for dealing with a threatening disaster situation or disaster.

It also oversees the provision and application of funds for mitigation and preparedness measures. It has the power to authorize the departments or authorities concerned to make emergency procurement of provisions or materials for rescue and relief in a threatening disaster situation or disaster. It also supplies such support to other countries in times of disasters as may be figured out by the central government. The State stays connected with the NDMA for implementing various projects / schemes which are being funded through the Central Government. The State also appraises the NDMA about the action taken by the State Government about preparation of DM plans and implementation of guidelines issued by the NDMA for various hazards.

11.2. National Institute of Disaster Management (NIDM)

The NIDM, in partnership with other research institutions, has capacity development as one of its major responsibilities, along with training, research, documentation and development of a national level information base. It networks with other knowledge-based institutions and functions within the broad policies and guidelines laid down by the NDMA. It organizes training of trainers, DM officials, and other stakeholders as per the training calendar finalized in consultation with the respective State Governments.

11.3. National Disaster Response Force (NDRF)

For a specialized response to a threatening disaster situation or disasters/emergencies both natural and human-induced such as those of Chemical,

Biological, Radiological and Nuclear (CBRN) origin, the National Disaster Management Act has mandated the constitution of a NDRF.

The general superintendence, direction and control of this force is vested in and exercised by the NDMA, and the command and supervision of the Force is vested in an officer appointed by the Central Government as the Director General of Civil Defense and National Disaster Response Force. Presently, the NDRF comprises eight battalions and further expansion may be considered at the right time. These battalions are positioned at various locations across the State.

NDRF units maintain close liaison with the designated State Governments and are available to them in case of serious-threatening disasters. While the handling of natural disasters rests with all the NDRF battalions, four battalions are equipped and trained to respond to situations arising out of CBRN emergencies.

Training centres are also set up by respective paramilitary forces to train personnel from NDRF battalions of respective forces and meet the training requirements of State/UT Disaster Response Forces. The NDRF units also impart basic training to all the stakeholders identified by the State Governments in their respective locations. In addition, the State Government also utilizes the services of the NDRF whenever required during emergency search, rescue, and response.

11.4. Armed Forces (AF)

Conceptually, the Armed Forces are called upon to assist the civil administration only when the situation is beyond the coping capability of the State Government. In practice, however, the Armed Forces form an important part of the Government's response capacity and are immediate responders in all serious disaster situations. Army, Navy, and Air force have played very vital role in the disastrous situations of Odisha Super Cyclone, Uttarakhand Storm, and Jammu-Kashmir Flood. Army and Air Force of India closely also experienced the search and rescue operation, relief and reconstruction works of severe disasters in the country.

Because of their vast potential to meet any adverse challenge, speed of operational response and the resources and capabilities at their disposal, the Armed Forces have historically played a key role in emergency support functions. These include communication, search and rescue operations, health and medical facilities, and transportation, especially in the immediate aftermath of a disaster. Airlift, heli-lift and movement of assistance to neighboring countries primarily fall within the expertise and domain of the Armed Forces.

The Armed Forces also participates in imparting training to trainers and DM managers, especially in CBRN aspects, high-altitude rescue, watermanship, and training of paramedics. At the State and District levels, the local representatives of the Armed Forces have been included in their executive

committees to ensure closer coordination and cohesion in all aspects related to Disaster Management.

11.5. National Remote Sensing Center

National Remote Sensing Centre (NRSC) at Hyderabad is responsible for remote sensing satellite data acquisition and processing, data dissemination, aerial remote sensing, and decision support for disaster management. NRSC has a data reception station at Shadnagar near Hyderabad for acquiring data from Indian remote sensing satellites as well as others.

NRSC Ground station at Shadnagar acquires Earth Observation data from Indian remote-sensing satellites as well as from different foreign satellites. NRSC is also engaged in executing remote sensing application projects in collaboration with the users. The Aerial Services and Digital Mapping (ASDM) Area provides end-to-end Aerial Remote Sensing services and value-added solutions for various large-scale applications like aerial photography and digital mapping, infrastructure planning, scanner surveys, aeromagnetic surveys, large scale base map, topographic and cadastral level mapping, etc.

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The National Database for Emergency Management is a unique initiative of NRSC which is been used for entering resource inventories and report disasters. This is new initiate and will be operational within few months at the district levels.

11.6. Airport Authority of India (AAI)

When disaster strikes, the airports are quickly overwhelmed with tons of relief materials (like food, bottled water, medical supplies, clothes, tents, etc.) arriving from all over the world. This material is urgently needed to be in the field. In such cases, AAI should appoint a senior officer at the airport for proper handling and

distribution (which includes precise unloading, inventory, temporary storage, security, and distribution of relief material) of relief material during a disaster situation.

The AAI shall prepare and provide a list of equipment required for handling the material to either MSDMA or the Secretary of Relief and Rehabilitation and the equipment will be procured and maintained through SDMA.

11.7. Indian Railways (IR)

Indian Railways is spread over a vast geographical area over 63000 route kilometers. Unlike in other countries where the role of Railways, in the event of a disaster, is restricted to clearing and restoring the traffic, in our country Indian Railways handles the rescue and relief operations. Railways are a preferred mode of transport both for the movement of people and relief material in bulk, if accessible.

Railways should have a provision for transportation of mass community and proper handling and distribution of relief material (through special trains, if required) in their disaster management plan.

11.8. India Meteorological Department (IMD)

The role of IMD has already been discussed in previous chapters.

The meteorological department undertakes observations, communications, forecasting and weather services. IMD was also the first organization in India to have a message switching computer for supporting its global data exchange.

In collaboration with the Indian Space Research Organization, the IMD also uses the Indian National Satellite System (INSAT) for weather monitoring of the Indian subcontinent, being the first weather bureau of a developing country to develop and maintain its own geostationary satellite system.

During the cyclone and flood seasons, the State Government keeps close contact with the IMD – Mumbai office for weather-related forecasts. Earthquakes occurring in the State which are of magnitude 3.0 and above on Richter Scale are also reported by the IMD to the State Government immediately.

11.9. Indian National Centre for Ocean Information Services (INCOIS)

INCOIS is a national agency of the Government of India, under Ministry of Earth Sciences. It provides the coastal and ocean information services, supporting developmental and operational sectors like ports, fisheries, shipping, meteorology, environment, offshore and coastal zone management in addition to promoting advanced oceanographic research in the country.

INCOIS generates and disseminates near real time information on Sea Surface Temperature (SST), chlorophyll, Potential Fishing Zones (PFZ) advisories, tracking of oil spills, forecast economical shipping routes, and upwelling zones along the Indian coast, utilizing both remotely sensed and conventionally observed data.

The parameters envisaged for dissemination include wind, wave, current, mixed layer depth, heat budget and maps on coral reef, mangroves, shoreline change and land use pattern. INCOIS thus plays a key role in supporting the nation for sustainable development of the coastal and ocean sectors through ocean information services.

INCOIS has already put in place an early warning system for Tsunami through which it alerts the coastal States whenever an undersea earthquake of higher magnitude capable of triggering a Tsunami is reported.

11.10. State Fire and Emergency Services (SFES)

The State Fire & emergency Services are crucial immediate responders during any disaster. They are the first responders (during Golden Hour after a disaster) and hence play a vital role in saving lives and property immediately after a disaster.

There are 10 Regional Disaster Management Centres (RDMCs) in the state working for city administrations. For purchasing of search and rescue materials there is budget provision with every RDMC. Along with SAR materials various capacity-building training courses are also provided for different target groups. Training on fire safety and disaster management is imparted to all fire stations staff by RDMCs.

11.11. Institute of Seismological Research (ISR)

ISR is the only institute in India fully dedicated to seismological research and is on course on being transformed into a premier international institute in a few years' time. ISR also does seismic micro zonation of areas prone to earthquakes. They help the State Government in keeping track of the seismic activities going on in highly seismic areas of the State through their state-of-the-art monitoring network. They also provide consultancy services to various private companies in feasibility studies related to the seismicity of the area prior to establishing a major project.

11.12. Bhabha Atomic Research Center

Bhabha Atomic Research Centre (BARC) is a premier multi-disciplinary Nuclear Research Centre of India having excellent infrastructure for advanced Research and Development with expertise covering the entire spectrum of Nuclear Science and Engineering and related areas.

Today India is self-sufficient in building nuclear power stations and has gained mastery over the entire nuclear fuel cycle. During operation the of the various

nuclear facilities, the primary safety objective is to protect the plant personnel, the people at large and the environment from radiation. Regular environmental assessment is necessary to ensure this. Measurement of radiation levels and other pollutants constitute the most important constituent of environmental assessment. For this purpose, Environmental Survey Laboratories (ESLs) have been established at each nuclear site to maintain a constant vigil on the environment in and around these facilities.

11.13. Mutual Aid Response Group (MARG)

MARG is an initiative promoted by DISH which is the regulatory agency in Maharashtra under the Factories Act 1948. It is a voluntary initiative on developing 'mutual aid arrangement' for effective emergency response. It is a forum to mutually help each other by sharing available resources to tackle emergencies in industrial pockets. It plays a pro-active role in risk reduction, awareness, and education. There are 15 operational groups in the State. A Group comprises -

- Directorate of Industrial Safety and Health
- Representatives of Large, Medium and Small-Scale Industries
- Technical Experts from Industries
- Safety Professionals
- Fire Brigade
- Local Police Personnel
- Medical Experts from Industries and Local Hospitals

There are two Emergency Response Centers in the State

- Rasayani
- Mahad- started functioning from March 2007

11.14. Media

Mass communications technology has already significantly affected how the public learns of and perceives disasters. Thus, the role of media, both print and electronic, is important in disaster management. During preparedness it may tremendously help people in awareness education, warning dissemination and evacuation, alerts government officials, and develops coordination among various stakeholders. During disasters, the media helps people to know updated information on rescue, relief operations and other arrangements. Certainly, it also controls the panic and helps people to understand the ground reality and cooperate with the government. Thus, media roles are overly sensitive and significant in preparedness, mitigation, response, and recovery works.

11.15. International Agencies

11.15.1. United Nation's Children Fund (UNICEF)

The department of Relief and Rehabilitation has signed a joint agreement with UNICEF in order to support Main streaming of Disaster Management in the district level. For this purpose, a team from UNICEF and RedR (UNICEF local Partner) are working under the guidance of the District Collector, Osmanabad. This team has created development plans with prime focus on Disaster Risk Reduction of 3-line departments with the district level HODs (Heads of Departments) and is integrating it into the mainstream activities. In addition, the team has created a Ready Reckoner for "Review of the District Disaster Management Plans" which can be used by any districts. The Ready Reckoner is a document drafted as per the guideline of the National Disaster Management Authority and the High-Power Committee Report, 2001 and is contextualized for use across all districts in Maharashtra. (Annexure 1). UNICEF is currently implementing a state level pilot project on Drought mitigation and prepared with 10,000 farmers across Osmanabad and Latur, where Water sanitation and hygiene (WASH), nutrition and health of the farmers and their families are looked after, and the impact of drought is reduced. This will act as a model framework for drought mitigation, especially for farming communities.

In addition, UNICEF has also provided a technical support staff to the State Government for Leasing with various departments and UNICEF partners in order to Mainstream Disaster Risk Reduction practices across the most vulnerable sectors. In addition to this UNICEF and UNDP will jointly work on the state level Departmental Disaster Management Plans.

11.15.2. United Nations Development Programme (UNDP)

UNDP is supporting the State Government of Maharashtra to draft the Departmental that Plans for 26-line departments in the first phase. Working groups of all the state level departments will be formulated and the UNDP will assist the departments to draft and implement the Departmental Disaster Management Plan. The list of line departments will be completed in consultation with the Relief and Rehabilitation department and as per the guidelines of the National Disaster Management Authority.

UNDP and UNICEF will also be jointly working for building the abilities of District Disaster Management Officers, implementing the components of the Sendai Framework, and supporting the Municipal Corporation of Greater Mumbai for Capacity Building. The Joint Action Plan is annexed in the Annexure 2

11.15.3. Programme Management Unit (PMU)

The Department of Disaster Management, Relief & Rehabilitation has appointed Palladium Consulting India Private Limited as the Technical Support Program Management Unit (PMU) since 23 March 2023 to support the department in

Comprehensive Disaster Preparedness, Mitigation and Response over a period of 4 years. The PMU is expected to provide technical assistance to the department in disaster management policy, planning, capacity building, technology integration, knowledge management and strengthening risk mitigation and governance across the notified disasters.

With a focus on preparedness and mitigation, the PMU will be working closely with the District Administrations/DDMAs in disaster management planning, strengthening DDMAs, training and capacity building, upgradation of District EOCs, mainstreaming disaster risk into development planning and ongoing development programmes, and enhancing engagement of PRIs and ULBs keeping the community at the centre state.

Scope of Work

The following scope of work has been envisaged for the Project Management Unit:

- Support the Department for planning a comprehensive disaster management strategy for the state of Maharashtra. Mitigation, preparedness, response, recovery, and relief shall be enhanced at the end of the assignment.
- Focus on developing SOPs (Standard Operating Procedures), Manuals, and guidelines for management of all notified disasters in the state.
- Facilitate the implementation of State Disaster Management Plan and District Disaster
- Management Plans and draft policies for its implementation to the last mile.
- Build institutional capacity at state and district level, assessment of preparation, and regular update of SOPs.
- Draft strategy to recommend, drive, and monitor initiatives for Disaster Prevention and Mitigation.
- End to end Disaster Preparedness activities for the State including DDMAs.
- Managing the operations of Disaster Management and Humanitarian Response team at the State and District levels
- Setting up of District Level Disaster Management and Humanitarian response teams
- Planning and Implementation of Training and capacity building including preparation of
- Training Modules, Capacity Building Framework etc.

- Providing Training and Capacity Building of all ecosystem stakeholders
- Risk Information and Community Engagement (RCCE) planning and content creation, supervision support Assistance to department in planning, design, defining protocols, data integration etc. of Emergency Operations Centers (EOCs) at state, districts, and regional levels. It would include assistance in selection of agency to implement the EOCs.
- Technical Support to the department to create a conducive environment for partnerships and collaborations with other Government Departments, UN (United Nations) and multilateral agencies, Private Agencies and Non-Government originations for preparedness, mitigation, capacity building and emergency response.

CHAPTER 12: FINANCIAL ARRANGEMENTS

The Disaster Management Act, 2005 provides the legal framework for disaster management and all related matters, including the financial aspects. As per the DM Act, financial assistance in the wake of disasters is provided through the State Disaster Response Fund (SDRF) and National Disaster Response Fund (NDRF). These funds have been created under the legal framework of Section 46 and 48 (1) (a) of the Disaster Management Act, 2005. The allocations to SDRF and NDRF are made by the Ministry of Finance as per Finance Commission recommendations.

12.1. 15th Finance Commission

Summary of Recommendations of the 15th Finance Commission relating to Disaster Risk Management

- (i) The ratio of contribution by Union and States to the State-level allocations for disaster management recommended by FC-XIII should be maintained. Thus, States are to contribute 25 per cent of funds of SDRF and SDMF except the Northeastern and Himalayan (NEH) States, including Maharashtra, which shall contribute 10 per cent, and the rest is to be provided by the Union Government.
- (ii) Mitigation Funds would be set up at both the national and State levels, in line with the provisions of the Disaster Management Act. The Mitigation Fund should be used for those local level and community-based interventions which reduce risks and promote environmentally friendly settlements and livelihood practices.
- (II) Allocation of disaster management funds to SDRMFs should be based on factors of past expenditure, area, population, and disaster risk index (which reflect States' institutional capacity, risk exposure, and hazard and vulnerability respectively). Assuming an annual increase of 5 per cent, the Finance Commission has arrived at the total corpus of Rs.1,60,153 crore for States for disaster management for the duration of 2021-26, of which the Union share is Rs. 1,22,601 crore and the States share is Rs. 37,552 crores.
- (III) Total States allocation for SDRMF should be subdivided into funding windows that encompass the full disaster management cycle. Thus, the SDRF would get 80 per cent of the total allocation and the SDMF 20 per cent. The SDRF allocation of 80 per cent may be further distributed as follows: Response and Relief – 40 per cent; Recovery and Reconstruction – 30 per cent; and Preparedness and Capacity-building – 10 per cent. While the funding windows of the SDRF and SDMF are not interchangeable, there could be flexibility for re-allocation within the three sub-windows of SDRF.

- (IV) The allocation for the NDRMF would be based on expenditure in previous years. Assuming an annual increase of 5 per cent, the total national allocation for disaster management is estimated to be Rs. 68,463 crores for the duration of 2021-26.
- (V) The allocation for the NDRMF should also be subdivided into funding windows like that of States' allocation for disaster management. Hence, the NDRF would get 80 per cent of the total allocation for the NDRMF, with further division into 40 per cent for Response and Relief, 30 per cent for Recovery and Reconstruction and 10 per cent for Preparedness and Capacity-building. The NDMF would be allotted 20 per cent of the total allocation for the NDRMF. While the funding window of NDRF and NDMF shall be maintained, there could be flexibility for re-allocation within these sub-windows.
- (VI) To discourage excessive and unsubstantiated demands from States, all Central assistance through the NDRF and NDMF may be provided on a graded cost-sharing basis. States should contribute 10 per cent for assistance up to Rs. 250 crores, 20 per cent for assistance up to Rs. 500 crore and 25 per cent for all assistance exceeding Rs. 500 crores.
- (VII) A Recovery and Reconstruction Facility may be set up within the NDRF and SDRF. Assistance for recovery and reconstruction is generally a multi-year program, and the assistance, shared between the Union and States, needs to be released annually against expenditures and only as a percentage of total cost.
- (VIII) State Governments need to have essential disaster preparedness to respond effectively to disasters. Their institutions and facilities must be equipped and well-functioning to meet the exigencies of a situation. The preparedness and capacity-building grants could be used to support the SDMA, SIDMs, training and capacity-building activities and emergency response facilities. A similar window of preparedness and capacity-building would be made available within the NDRF, which could be used to support national agencies.
- (IX) Major capital works required for proper upstream river basin management (to mitigate annual flood disasters caused by river erosion) with gestation periods of ten to fifteen years cannot be accommodated through Finance Commission award. Therefore, the Finance Commission has recommended that such projects should be considered as national priority projects. Only such holistic projects can help address flood mitigation properly. A piecemeal approach will simply result in yearly washing away of river embankments.
- (X) There should be six earmarked allocations for a total amount of Rs. 11,950 crores for certain priority areas, namely, two under the NDRF (Expansion and Modernization of Fire Services and Resettlement of Displaced People affected

by erosion) and four under the NDMF (Catalytic Assistance to Twelve Most Drought-prone States, Managing Seismic and Landslide Risks in Ten Hill States (this would include Maharashtra), Reducing the Risk of Urban Flooding in Seven Most Populous Cities and Mitigation Measures to Prevent Erosion).

(XI) In order to strengthen institutional capacities, a dedicated capacity should be set up to supervise the NDRMF and SDRMF and augment disaster funding through other sources. In addition, a disaster database should be developed to help assess the impact of expenditures on different aspects of disaster management.

Allocation of funds to Maharashtra Government for Disaster Risk Management under 15th Finance Commission

The 15th Finance Commission has made a departure from response to include mitigation aspects also and recommended setting up of National and State Disaster Risk Management Fund (SDRMF). The share of Central and State Government in North-Eastern States and the two Himalayan States of Himachal Pradesh and Uttarakhand is 90:10, whereas for all other States it is 75:25.

The total allocation for Disaster Risk Management Fund for 2021-26 is Rs 28033 Crore for Maharashtra. The Disaster Risk Management Fund has been recommended as a comprehensive fund, both for response and mitigation activities. The break-down of the Fund is Response and Relief (40%), Recovery and Reconstruction (30%), Capacity Building (10%) and Mitigation (20%). While the funding windows of SDRF and SDMF are not inter-changeable, there could be flexibility for re-allocation within the three sub-windows of SDRF.

12.2. State Disaster Response Fund (SDRF)

The State Disaster Response Fund in Maharashtra shall be used only for meeting the expenditure for providing immediate relief to the victims of flood, drought, earthquake, fire, cyclone, hailstorm, landslides, cloudburst, heat wave etc. While the state can draw from State Disaster Response Fund for the emergency response and relief, there are provisions to adjust a portion of the expenditure from funds released from National Disaster Response Fund between the fiscal year in which National Disaster Response Fund is released and the expenses incurred by state in the previous fiscal year under State Disaster Response Fund.

In case the State faces another severe disaster during the same year, no reduction will be made while releasing assistance from the National Disaster Response Fund. State-specific disasters, which are not included in the notified list of disasters eligible for assistance from State Disaster Response Fund and National Disaster Response Fund, can be met from State Disaster Response Fund within the limit of 10 percent of the annual fund allocation of the State Disaster Response Fund.

The two response funds at national and state level have provisions for the following:

- Gratuitous Relief
- Search and Rescue operations, as per actual cost incurred
- Relief measures
- Air dropping of essential supplies
- Emergency supply of drinking water
- Clearance of affected area, including management of debris
- Agriculture, Animal husbandry, fishery, handicraft, artisans
- Repair/ Restoration (of immediate nature) of damaged Infrastructure
- Capacity development

The default period of assistance is as per norms prescribed. However, based on assessment of the ground situation, the State Executive Committee (SEC) may extend it beyond the prescribed time limit subject to the condition that expenditure on this account should not exceed 25 percent of State Disaster Response Fund allocation for the year. The SEC will organize contributions from the relevant State Government, administer the State Disaster Response Fund and invest the accretions to the State Disaster Response Fund in accordance with the norms approved by GOI from time to time.

The state will meet the capacity development expenses from the State Disaster Response Fund and not National Disaster Response Fund, subject to a limit of 10 percent of the State Disaster Response Fund. Capacity Development covers the following:

- Setting up/strengthening of Emergency Operation Centres (EOCs) in the State
- Training/Capacity Building of stakeholders and functionaries in the State
- Supporting disaster management centres in the state
- Preparation of Disaster Management Plans based on Hazards, Risks, and Vulnerability Analysis
- Strengthening of SDMA and DDMA's

12.3. State Disaster Mitigation Fund (SDMF)

Of the total State Disaster Risk Management Fund, 80% is to be utilized for response, relief, recovery, and reconstruction. However, 10% of the Response Fund may be utilized for capacity development. Risk Management Fund may be considered as State Disaster Mitigation Fund, to be spent on the items indicated above to the extent of 20% of the State Disaster Risk Management Fund. It shall be considered as the State Disaster Mitigation Fund in terms of section 48(1) (c) of the Disaster Management Act, 2005.

The recommendations of the 15th Finance Commission for the Mitigation Funds are as follows:

- Mitigation funds shall be set up at both national and state levels in the form of a National Disaster Mitigation Fund (NDMF) and State Disaster Mitigation Funds (SDMF), in accordance with the Disaster Management Act.
- These mitigation funds shall be used for those local level and community-based interventions which reduce the risks and promote environment-friendly settlements and livelihood practices. However, large-scale mitigation interventions such as construction of coastal walls, flood embankments, support for drought resilience etc. should be pursued through regular development schemes and not from the mitigation fund.
- The detailed guidelines for the constitution and utilization of these funds shall be issued by the Ministry of Home Affairs, in consultation with the National Disaster Management Authority (NDMA). These funds should be supervised by the NDMA at the national level and State Disaster Management Authorities (SDMAs) at the state level as per the Act.
- NDMA has come out with an indicative list of items (Annexure I, NDMF Guidelines) of work on which the Mitigation Funds may be utilized.

Schemes that may be undertaken under State Disaster Mitigation Fund by the State Government

As stated above, mitigation projects may be undertaken from Mitigation Fund at local and community level and large-scale interventions should be undertaken only through regular development schemes.

The local and community level interventions have been included in the list of 64 items in Annexure 8.2 of the report of the XV Finance Commission¹. However this is only an indicative list of mitigation activities It may also include conduct of mock drills, procurement of essential inexpensive equipment for first aid or search and rescue equipment needed at rural and community level, community based disaster risk management training programs, measures to promote environment-friendly settlements, mainstreaming of disaster risk reduction in the development plans at local and community level, interventions needed for social inclusion of marginalized communities at grass root level, empowerment of women through their active participation in various training programs, medical first response and search and rescue teams, involvement of self-help groups and civil society organizations in promoting disaster risk reduction and environment-friendly measures at local and community level, development of village level disaster management plans etc.

However, since the State Disaster Mitigation Fund is at the disposal of the State Disaster Management Authority (SDMA), if any additional activities are to be taken up which are not included in the indicative list at Annexure I, the approval of the SDMA to the activities proposed to be undertaken with the outlay needed for undertaking such activities may invariably be obtained from SDMA.

It would be seen from at Annexure I, NDMF/SDMF Guidelines of NDMA² that the activities shown therein are disaster specific. Besides, there are activities which are common to several disasters. So far, such activities are taken up at local or community level, the SDMF could be utilized for that purpose. Similarly, Annexure 8.2 does not specify all disasters. Disasters like COVID 19 Pandemic, which has affected Maharashtra also, are not covered in the indicative list. Similarly, there may be state-specific disasters which are not included in the Indicative List. Activities to mitigate the impact of such disasters can also be undertaken from SDMF provided these interventions are at local or community levels that help reduce risks and promote environment-friendly settlements and livelihood practices.

Konkan Disaster Mitigation Project

The Konkan Mitigation Project was envisioned by the Government of Maharashtra for a 4-year duration. The project will cover **five** districts of Konkan region and address the risk and vulnerability of the people of the region against cyclone, floods, landslides, etc. The sanctioned package of the project is Rs.3200 Crore. Of the money sanctioned, Rs 2,000 crore will be given from the SDRMF, and rest will be given in the next four years from 2022 to 2025 through the State Budget. The project will undertake following mitigation measures to address the aforesaid hazards and vulnerabilities of these districts:

- i. Erosion Prevention Embankments
- ii. Underground Cabling of electrical Wires
- iii. Multipurpose Cyclone Shelters
- iv. Lightning Arrester System
- v. Early Warning System
- vi. Preventive measures in Landslide prone areas

12.4. Alternate Sources of Funding

While NDRMF and SDRMF primarily are the main sources to meet the expenditure on response, relief, recovery and reconstruction and a key source to meet expenditure on mitigation at local and community level, it has to be conceded that it cannot meet the entire requirement of funds during various phases of disaster management and additional funds have to be provided to meet the requirement, particularly after the introduction of Goods and Services Tax, which has subsumed several components of

² NDMF/SDMF Guidelines, NDMA,

National Calamity and Contingency Duty (NCCD). These options are discussed below.

12.4.1. Public Funded Schemes

The primary mechanism for funding DRR related schemes and projects in Maharashtra is through Public Funded Schemes at Central and State level. Various nodal Ministries play a key role in disaster management as far as specific disasters are concerned. These nodal Ministries as well as other Ministries and Departments have dedicated schemes aimed at disaster prevention, mitigation, capacity building, etc. within their domain. Existing examples include the scheme of MHA for Strengthening of Fire and Emergency Services, Financial assistance to ATIs and other Training institutions for disaster management, flood management and flood forecasting programs of Ministry of Jal Shakti (MOJS). The Department of Space (DOS) has a Disaster Management Support Program, and the Ministry of Earth Sciences (MOES) has a project on Early Warning System.

Apart from this, many of the schemes, which are implemented by various ministries/ departments, have embedded DRR components, for example, those implemented by the Ministry of Environment, Forests and Climate Change (MOEFCC). There are many other programs that improve societal resilience, which is a critical component of DRR, such as the National Rural Health Mission (NRHM), Mahatma Gandhi National Employment Guarantee Scheme, and the Housing and Urban Affairs department's Urban Renewal Mission.

12.4.2. Flexi Funds as a part of Centrally Sponsored Schemes

As per Department of Expenditure, Ministry of Finance, the NITI Aayog has issued instructions for rationalization of Centrally Sponsored Schemes (CSS), vide OM No. O — 11013/02/2015-CSS & CMC dated August 17, 2016. As per para 6 of the said OM, flexi-funds available in each CSS has been revised to 25% for States, and 30% for UTs, of the overall annual allocation of each scheme. The flexi -fund component within the CSS would be used to achieve the following objectives:

- To provide flexibility to States to meet local needs and requirements within the overall objective of any given Scheme at the sub-head level.
- To pilot innovation to improve efficiency within the overall objective of any given Scheme at the sub-head level.
- To undertake mitigation/restoration activities in case of natural calamities, or to satisfy local requirements in areas affected by internal security disturbances.

12.4.3. Externally Aided Projects

Besides the funds which are available through public funded schemes, efforts have also been made by the centre to mobilize the resources from external funding agencies for vulnerabilities assessment, capacity development, institutional strengthening of response mechanism and mitigation measures etc. The Central Government would continue to support states for reconstruction and rehabilitation in the aftermath of major disasters through aid from the World Bank and other such external funding agencies.

12.5. DM concerns to be mainstreamed in Development Plans/ Projects

The Ministry of Finance, at the instance of NDMA, had issued instructions dated 19.06.09, 12.04.10 and 26.05.10 introducing a system of self-audit that when any development plan or project is formulated, it may be examined whether it would add to vulnerabilities or create new vulnerabilities. In that case the mitigation measures to reduce such vulnerabilities will be added to the project and the expenditure involved in the implementation of such measures will constitute a part of the total cost of the project.

12.5.1. Insurance and Risk Transfer

In the past, Finance Commissions have considered and rejected the involvement of Insurance Companies for providing disaster relief to affected people on the plea that it would be cheaper for the state government to directly provide relief to the disaster-affected people. However, the 15th Finance Commission has felt that there is a strong case for introducing insurance and risk pooling in niche areas, where essential conditions for market-based risk management instruments exist.

The use of insurance instruments is most efficient for natural perils, which occur infrequently but have high potential impact. The cost of response and recovery for frequently occurring natural hazards (occurring once every five to ten years, depending on the peril) are best absorbed by public funds such as the SDRF and NDRF.

However, severe natural hazards occurring every ten to hundred years are best suited to be covered by an insurance policy or catastrophe bond. However, these insurance mechanisms need to be introduced with due diligence in partnership with insurance companies. The Pradhan Mantri Fasal Bima Yojana (PMFBY), the government sponsored crop insurance and Weather Based Insurance, provides risk cover to farmers. This and similar initiatives will be explored further and localized in the context of Maharashtra, to address the risk of local farmers.

12.5.2. Reconstruction Bonds

As brought out by XV Finance Commission, in a post-disaster situation, State Governments can issue reconstruction bonds, with a maturity of three to five years, with the approval of the Union Government. People would like to contribute to recovery and reconstruction efforts, and they would prefer to invest in bonds, for reasons other than just financial returns. So, the State Governments could issue these bonds with a lower yield. However, the resources raised by these bonds should largely be spent on the construction of productive and social assets.

12.5.3. Crowd Funding Platform for Disasters

Crowd funding has emerged as a key funding platform to mobilize resources for disaster relief and recovery. Both the Union and State Governments need to recognize the role of crowd funding and use it when disasters occur. While several crowd funding platforms come up following a disaster event, a platform set up by the government with specified objectives and an assurance of transparency can attract public contributions on a more significant scale. Setting up a crowd funding platform would require skills and expertise, which the Governments could consider outsourcing. Identifying the right time for crowd funding, setting up secure payment gateways and ensuring accountability and transparency are the most important considerations for the success of such an initiative. It is an area where both the Union and State Governments should prepare operational guidelines together.

With the advent of social media and the increased popularity of digital payments, people are now increasingly switching to the faster, more convenient way to meet urgent, pressing needs where a larger sum of money is needed. In fact, in Maharashtra, the crowd funding platform has seen an increase of almost four times in the number of fundraisers set up from the state compared to the previous year. Another interesting observation is that Maharashtra is a pioneering state in driving online fundraisers through closely knit online groups and communities. Almost 92% of all the fundraisers from the state are funded by individuals and groups using word of mouth on social media.

Fundraisers from Maharashtra have collected nearly INR 1 Crore so far, for various causes: cancer care, treatment for rare medical conditions, kidney transplants or even to address local community concerns in rural areas, or in the aftermath of a disaster. During the floods of 2017, a group of volunteers raised over Rs 10 Lakh through their online fundraiser with the help of over 600 people from across the world. The funds were used to provide immediate relief, dry ration, and set up medical camps in flood affected areas. Hundreds of families received instant help from supporters around the globe within a click. Similarly, doctors too, are now resorting to trustworthy online platforms to ensure more patients can avail quality healthcare and specialized medical facilities, undeterred by financial limitations.

The significant advantage of a crowd funding platform is that donors know for which purpose and for whose benefit they are contributing. There are several non-governmental organizations which might come forward to help the State Government to mobilize funds for disaster relief, recovery, and reconstruction. For instance, during Maharashtra floods in 2016, crowd funding was undertaken by Ketto. A new Maharashtra party, the Maharashtra Jatiya Parishad had resorted to crowd funding before the elections. A crowd funding campaign has been undertaken to help keep 'free vaccine' pledge and raise at least Rs.100 crore, of the needed Rs. 800 crores for vaccination of population in 18-45 age group in Maharashtra. The Milaap Foundation in Maharashtra has also played a key role in crowd fund raising in Maharashtra for various social causes. ASDMA can initiate crowd funding as per their need.

12.5.4. Other Financing Options

The options for restoration of infrastructure / livelihoods, like utilization of the funds within State Sponsored Scheme (if any) for mitigation/restoration activities in the event of natural calamities, or contingency funding for any untoward occurrence may also be explored.

Opportunities of CSR investments may also be explored and elaborated for increasing State level resilience. As these days the corporate sector is adopting the States/ Districts for the specific interventions, the CSR investments may be covered under the umbrella of the Companies Act, 2013.



Government of
Maharashtra

Ready Reckoner for District Disaster Management Plan Review

Introduction

Maintaining and implementing updated District Disaster Management Plan (DDMP) in each district of India is the constitutional mandate as per the section 31 of Disaster Management Act-2005 of Gol. The Act mandates all the District Disaster Management Authorities (DDMA) that is headed by District Magistrate to prepare a comprehensive and holistic DDMP and update it annually. Under the DM Act'2005, DDMA must adopt a continuous and integrated process of planning, organizing, coordinating, and implementing measures which are necessary and expedient for prevention and mitigation of disasters. These processes are to be incorporated in the developmental plans of the different departments and preparedness to meet the disaster and relief, rescue, and rehabilitation thereafter, to minimize the loss to be suffered by the communities and are to be documented so that it is handy and accessible to the public.

The importance of DDMP can hardly be overstated. In fact, DDMP acts as a key constitutional modality to address disaster risks by providing a clear pathway for effective risk governance, seeking disaster resilient communities and service delivery systems. The effective implementation of the plan will protect the hard-earned developmental gains by minimizing loss of life, property and livelihood even in times of crisis situation and enable early recovery of communities and service delivery system. This could be achieved only when the DDMP informs both the actual and futuristic risks and has robust risk governance mechanisms in place.

The DDMA oversees the implementation of DDMP through the line departments which are close to ground realities on nature and understand the diversity of impacts resulting from different disasters and extremes events on land, lives, property, ecosystem, and resources of the people. In addition, the DDMP has established a mechanism for inter-department/interagency coordination – to not only do disaster response and preparedness but to move beyond by reducing disaster risks through structural and non-structural mitigation and prevention measures. It also informs on climate induced disasters and identifies the exposure and susceptibility of socio-economic assets to climate variability. Experience from various states suggests that DDMP formulation and review process and updating of risk analysis etc. also becomes an opportunity for capacity development of the key stakeholders, particularly the line-departments.

Purpose of DDMP Review

The purpose of the DDMP review is to analyses the exiting DDMP document with special reference to Disaster Management Act, Sendia Framework for the identification of appropriateness and adequacy of planning actions segregated in 12 chapters of the NDMA model Framework and arrive at key recommendations for revision.

Guiding Framework Used for DDMP Review

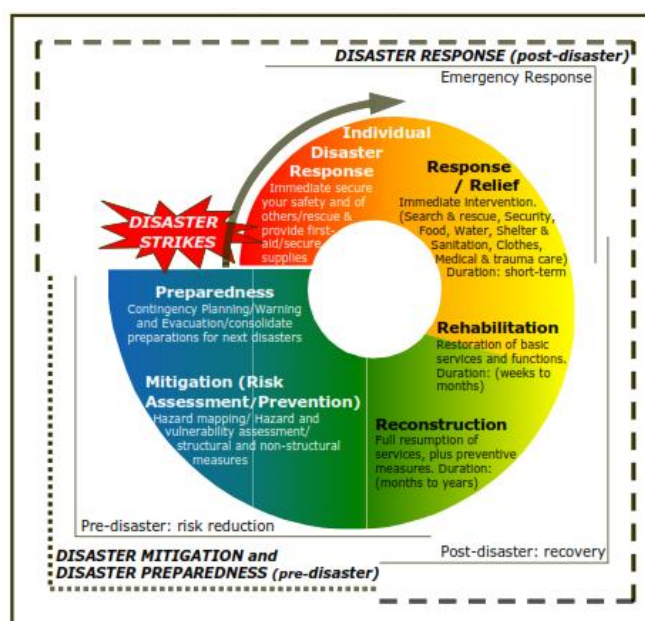
“The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries” is the expected outcome and goal of the Sendai Framework for Disaster Risk Reduction 2015–2030 which was adopted at the Third United Nations World Conference on Disaster Risk Reduction, held in March 2015, at Sendai, Japan. The realization of this outcome requires a strong commitment in every country at all levels in the implementation and follow-up of the SFDRR for the creation of a conducive and enabling environment.

This first Asian Ministerial Conference for Disaster Risk Reduction (AMCDRR) after the advent of the Sendai Framework was hosted by the Government of India in November 2016 at New Delhi. In this conference Heads of Government, Ministers, and Heads of Delegation of countries in Asia and the Pacific endorsed “The New Delhi declaration on disaster risk reduction in Asia and the Pacific 2016”. Out of 12 articles in this declaration, the sixth article is to “Improve preparedness for disaster recovery by strengthening institutional frameworks, establishing standards, and enhancing capacities to ensure that disaster recovery integrates risk reduction measures to build back better.”

Thus, District Disaster Management Plans (DDMP), become an important planning, implementation, and monitoring process to ensure realization of above stated goal of SFDRR and the sixth article of Delhi Declaration 2016 in practice.

The DDMP needs to be done in a comprehensive, practical, participatory, bottom–up and action-oriented approach so that the plan becomes a useful ‘handbook’ / ‘guide’ for strategic implementation by district and local authorities both, at time of a disaster, as well as during the normal time when risk reduction measures such as mitigation, prevention, preparedness, and capacity building actions are taken. The plan shall create scenarios based on the disaster and climatological history and pertaining vulnerabilities to evolve emerging and futuristic risks. Risks pertaining to increasing climate variability shall also be considered as to ensure that enough and appropriate measures are taken mitigating those risks in future and be prepared for emergency response. The DDMP review entails all the components of Disaster Management cycle as shown in the figure below:

Disaster Management Cycle



Disaster management can be defined as the body of policy and administrative decisions and operational activities which pertain to the various stages of a disaster at all levels. Broadly disaster management can be divided into pre-disaster and post-disaster contexts. There are three key stages of activity that are taken up within disaster management. They are:

1. Before a disaster strikes (pre-disaster). Activities taken to reduce human and property losses caused by the hazard and ensure that these losses are also minimized when the disaster strikes. Risk reduction activities are taken under this stage, and they are termed as mitigation and preparedness activities.
2. During a disaster (disaster occurrence). Activities taken to ensure that the needs and provisions of victims are met, and suffering is minimized. Activities taken under this stage are called emergency response activities.
3. After a disaster (post-disaster) Activities taken to achieve early recovery and do not expose the earlier vulnerable conditions. Activities taken under this stage are called response and recovery activities.

To enable a uniform framework for preparation of DDMPs in accordance with the mandated provision of DM Act, National Disaster Management Authority (NDMA) has prepared "Model Framework for preparation of DDMP."

National Model Framework for DDMP, NDMA – 2014

According to the DDMP framework issued by National Disaster Management Authority (2014), DDMPs must cover all the phases of disaster management cycle though different chapters, which includes mitigation, preparedness, response, recovery, rehabilitation, and reconstruction plans. It must also help the District Administration to timely and effective response during the disasters to reduce the adverse impact of

hazards on human life, economy, environment, critical services, and livelihood of the local communities.

NDMA has issued a framework for DDMP (NDMA 2014) to guide DDMA to carry out risk-informed planning and decision making to help planners examine hazards or threats and produce integrated, coordinated, and synchronized plans. When accomplished properly, planning provides a methodical way to engage all stakeholders in thinking through the life cycle of a potential crisis, determining required capabilities, and establishing a framework for roles and responsibilities, taking end objectives into consideration.

This model framework recommends that every DDMP should have 12 chapters with 21 annexures and 11 types of maps. All the chapters are equally important to prepare a comprehensive and holistic DDMP. Besides the national framework, the other frameworks, policies to be considered are Sendai Framework of Action for Disaster Risk Reduction (SFDRR), National Disaster Management Policy (2009) and Hazard specific, GO-NGO Coordination, IRS guidelines drafted by NDMA, and the State Disaster Management Plan also should be considered.

This ready reckoner is designed to help district planners navigate the planning process through a mix of —instructions describing the content chapter wise as defined in DDMP framework (NDMA 2014). The DDMP ready reckoner is useful to District Administration, all center and state offices in the district, local other authorities, Government training institutions, other key stakeholders such as IAGs, academic institutions and SDMA/ NDMA specifically for replication to other districts.

Steps for DDMP review

DDMP Planning team should establish a process for reviewing and revising the plan. Reviews should be a recurring activity. Annual review is considered minimum. It should be mandatory to consider reviewing and updating the plan after the following events:

- i. A major incident.
- ii. A change in operational resources (e.g., policy, personnel, organizational structures, Management processes, facilities, equipment).
- iii. A formal update of planning guidance or standards.
- iv. After each activation of EOC, IRS, etc.
- v. After carrying out major exercises such as Mock drills, simulation exercises, etc.
- vi. A change in the district 's demographics or hazard or threat profile.
- vii. The enactment of new or amended laws or ordinances. The responsibility for the coordination of the development and revision of the basic plan, annexes, appendices and implementing instructions must be assigned to the appropriate person(s).

It is recommended that DDMP be internally reviewed on a yearly basis, and either be updated or reaffirmed. The updates or reaffirmed document may also be used to summarize the accomplishments of the past year and help the administration to prioritize mitigation goals for the next year. However, in the initial years it is sometimes

not possible for yearly updating as it could take 3-5 years to see the results of the plan. However, the district planners should make provisions for making timely updates by keeping records of any amendments, publishing periodic best practices, etc.

Reviewing a DDMP is a process and is done in steps. The following are the key steps for DDMP review –

Step 1: Review Initiation

A review team/ committee is formed internally to review the DDMP. The team could comprise of members from Government offices such as RDC, DDMO, key department HoDs (Heads of Departments), NGOs, academicians, research persons, etc. A third-party review process could also be initiated in cases where there is lack of understanding of the subject. The team should have a sound understanding of Disaster Risk Management and its components. The team should jointly agree on a point of inquiry or checklist for reviewing the document. This process is crucial, and it defines how the review will be executed.

A DDMP review inception report should be prepared which details the scope of work, point of inquiry, framework of analysis, review process, role and responsibilities of the review team and period of review. The inception report should be approved by the DDMA before the start of the review process. A copy of the inception report could also be shared with the State offices concerned.

Stage 2: Desktop review

Upon the approval of the inception report, the review team should thoroughly read the current DDMP in accordance with the point of inquiry. Besides the DDMP, the team should also update themselves on the national/ state policies, state level plans, national guidelines and current department plans of various government offices in the district. The team should ensure that all the required plans and documents are received based on which the desktop review is done.

Stage 3: Consultation with key officials

Based on the findings of the desktop review, the review team could decide upon to consult with key government officials and other stakeholders who were involved in the formation of the current DDMP. This would help the team understand the process in which current DDMP was prepared and ascertain the gaps too.

Stage 4: Field/ Observation Study

The review team could also visit a few works and activities done as per the plan. They could also meet members of the communities especially for understanding activities such as community preparedness, schools, and colleges to understand the awareness

levels on DM education among children, women, and youth. Wherever possible, the review team could visit a few training or mock drills taking place at the time of review.

Step 5: Guidance for DDMP Review

After the desktop review, field observation and consultation with officials, the next step is the actual review of the DDMP. The DDMP is reviewed in content with the point of enquiry along with the national framework for DDMP review, NDMA – 2014.

This model framework recommends that every DDMP should have 12 chapters with 21 annexures and 11 types of maps. Each chapter is analyzed then documented.

Step 6: Sharing the report for feedback and finalization.

The DDMP review report drafted should be circulated with all key stakeholders who are primarily responsible for the direct implementation of the DDMP at the district level. The report should also be shared with SDMA, DMU for feedback.

Based on the availability of time and resources, the review team can organize a one-day workshop to share the findings and recommendations with the key stakeholders. Such a workshop could help the review team in receiving direct feedback and consensus on the report.

The Final copy of the DDMP review report should be approved by the DDMA and shared with all Government offices in the district. A copy of the document should also be shared with other stakeholders and concerned state offices.

DDMP Review Process – Chapter Wise Review Through Point of Inquiry

Chapter 1: Introduction

The chapter is important in terms of explaining the paradigm shift from relief centric approach to response to a proactive prevention, mitigation, and preparedness-driven approach for conserving developmental gains and to minimize loss of life, livelihood, and property.

Point of Inquiry

1. As per the guidance provided in NDMA model framework the aims and goals of DDMP should cater to entire disaster management cycle including HRVCA, Preparedness, mitigation, prevention, coordination ability building, MDRR, relief, response rehabilitation, reconstruction, recovery. While reviewing aims and goals, it is important to assess if this section caters to all actions as mentioned. It is also important to analyze if aims and objectives also cater to resource mobilization mechanisms.
2. The Chapter should have a list of stakeholders involved with well-defined duties and responsibilities of each stakeholder.
3. Include and cite the legal and administrative basis for evolution of the plan; mention references that form the legal basis for actions outlined.
4. The collaborative planning process should have details such as team formation, understanding DM context of the district, DM measures to be taken plan development and resource mobilization. Also details of plan preparation (write, review, approve mechanism and issue), plan implementation and maintenance (exercise, review, revise and support) should be well articulated.

Chapter 2: Hazard Vulnerability Capacity Risk Analysis (HVCRA)

The DDMP is context specific and visualizes various situations based on hazard history. Hazards, vulnerabilities, coping capacities and possible exposure levels are adequately analyzed where possible to identify and understand risks. Risk identification considers futuristic risks induced by various contributing elements to climate change. Section 30 (2) iii of the DM Act 2005 ensures that the DDMA identifies areas in the district that are vulnerable to disasters and appropriate measures are undertaken by the departments at the district levels as well as by local authorities.

Point of Inquiry

1. According to Section 30 (2) iii of the DM Act 2005 ensures that the DDMA should identify areas in the district that are vulnerable to disasters and appropriate measures are undertaken by the departments at the district levels as well as by local authorities.

2. The DDMP is context specific and should visualize various situations based on hazard history. Hazards, vulnerabilities, coping capacities and possible exposure levels are adequately analyzed where possible to identify and understand risks.
3. Risk identification should consider futuristic risks induced by various contributing elements to climate change.
4. The section should provide an analysis on key issues and challenges in sustainable development of the district with special reference to hazard, vulnerabilities, and capacities.
5. Analysis should consider the severity of the hazard and its impact on the communities, potential risk possessed and the sectoral issues (health, food, drinking water, nutrition, education, livelihood, psychosocial effects, migration, etc.).
6. Hazard specific scenarios should be developed based on the context and the history of disaster occurrences.

Chapter 3: Institutional Arrangements for Disaster Management (DM)

The Disaster Management Act 2005 provides for an effective institutional mechanism for drawing up and monitoring implementation of disaster management plan for prevention and mitigating effects of disasters and for taking a holistic, coordinated and prompt response to any disaster situation.

Point of Inquiry

- Section 25 of DM Act 2005 mandates for establishment of DDMA at district and provides its composition. Ensure whether the DDMA coordinates and monitors sector specific DRR activities that are planned and implemented by Government departments, local authorities, and other stakeholders in the district.
- The institutional mechanism for disaster management at the district level, as envisaged in the national plan and other national guidelines should be active and functional. There should be clear mentions of their roles and responsibilities.
- The chapter should provide scope for public private partnership and avenues for strategic partnership in reducing disaster risks in the district.

Chapter 4: Prevention Measures

The adverse impacts of hazards, in particular natural hazards, often cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. Mitigation measures include engineering techniques and hazard-resistant construction as well as improved environmental and social policies and public awareness. Whereas Prevention expresses the concept and intention to completely avoid potential adverse impacts of hazardous events. While certain disaster risks cannot be eliminated, prevention aims at reducing vulnerability and exposure in such contexts where, as a result, the risk of disaster is removed.

Point of Inquiry

- Based on risk analysis there should be adequate measures taken for prevention and mitigation measures by various national and state government offices of the district, local authorities, and other stakeholders.
- Departments should be able to mobilize resources and budgetary provisions for effective implementation of prevention and mitigation measures.

Chapter 5: Preparedness Measures

A preparedness plan establishes arrangements in advance to enable timely, effective, and appropriate responses to specific potential hazardous events or emerging disaster situations that might threaten society or the environment. Preparedness is based on a sound analysis of disaster risks and good linkages with early warning systems, and includes such activities as contingency planning, the stockpiling of equipment and supplies, the development of arrangements for coordination, evacuation and public information, and associated training and field exercises. These must be supported by formal institutional, legal, and budgetary capacities.

Point of Inquiry

1. The chapter should have details of the following components along with implementation action points and responsibilities –
 - i. Early Warning Institutions and their responsibilities and early warning dissemination strategy (last mile connectivity)
 - ii. District Emergency Operation Centre (EOC) along with SOP for EOC.
 - iii. Incident Response Team (IRT) with including procedures for activation of IRS.
 - iv. Emergency Support Function (ESF)
 - v. Emergency Response Team – Quick Response Team (QRT)
 - vi. Task force Teams – First Aid, Search & Rescue, Evacuation and Damage and Loss Assessment Team
2. There should be protocols for (i) resource mobilization, seeking help from Army, NDRF, PSUs (Public Sector Undertakings) (ii) Procurement of equipment & SOP for rate contract (iii) Logistics, (iv) stock piling and (v) arrangements of VIP visits during disasters should be detailed in the plan.
3. There should be details on media management and information dissemination strategies.
4. The chapter should have details on community preparedness with specific mentions on community warning system, action points on community awareness and education on hazards, vulnerability capacities and risks, preparedness measures by community along with responsibility.
5. The chapter should also mention knowledge management strategy, networking and sharing of information on resources through IDRN/ SDRN, etc.

Chapter 6: Capacity Building and Training Measures

Developing a DDMP without building capacity or raising awareness amongst stakeholders can be detrimental to the development of a successful and sustainable plan. Stakeholders and communities are critical components to a successful, long-term, sustainable disaster management plan. Capacity Building develops and strengthens skills, competencies, and abilities of both Government and non-government officials and communities to achieve their desired results during and after disasters, as well as preventing hazardous events from becoming disasters.

Point of Inquiry

1. The chapter should have mention of learning needs assessment or capacity gap analysis to quantify the surge needs, based on which capacities can be identified / mapped / linked.
2. The institutional capacity building strategy should cover all aspects of capacity building starting from identification of needs, to designing training, organizing, implementing to monitoring and evaluation.
3. The detailed training programme should cover training/ workshops for policy makers, government officials, Engineers, Architects, Masons, Doctors, Nurses, Teachers, NGOs and other professionals, Police, Fire Services, SDRF, other stakeholders.
4. There should be details along with a training calendar for Training of Trainers for civil defense/ volunteers. The master trainers should include people with vulnerabilities too such as people with disabilities, etc.
5. There should be capacity building strategy for disaster management education in schools including residential one and colleges.
6. There should be an inventory of trained professionals, engineers, architects, masons, medical professionals, rescue specialists etc.
7. There should specifically be mentions of refresher, follow up training at all levels.
8. There is a calendar for emergency exercises/ mock drills in communities, education institutions, crowded places/ events, industrial areas.

Chapter 7: Response & Relief Measures

Prompt and effective response minimizes loss of life and property. A caring approach for the special needs of vulnerable sections is imperative. Section 30(2) xv – xix of DM Act 2005 envisage powers to DDMA to prepare, review, update district level response plan and guidelines and ensure that all government departments in the district and local authorities prepare their response plan in accordance with the district response plan. It also gives power to DDMA to coordinate response to any threatening disaster situation and disaster and also advise, assist, and coordinate the activities of the

departments of the government, statutory bodies, and other governmental and non-governmental organizations in the district.

Point of Inquiry

1. There should be well defined procedures and processes for carrying out emergency needs and damage assessment.
2. The plan should have hazard specific scenario based standard operating procedures for each hazard with specific mentions of how the event unfolds, timeline of actions, activation of ESF/ IRS, DEOC, activation till deactivation of IRS, resource mobilization, horizontal and vertical coordination, actions and responsibilities.
3. There should be details of crowd management for mass gathering/ events.
4. There should be action plans by Line-departments, particularly ICDS, schools, health system and PHED with roles and responsibilities on service continuity during disasters.
5. The plan should detail our targeted intervention especially during relief distribution for addressing vulnerable sections and people with vulnerabilities.

Chapter 8: Reconstruction, Rehabilitation, and Recovery Measures

There should be a near-seamless transition from response activities to short-term recovery operations including restoration of interrupted utility services, re-establishment of transportation routes and the provision of food and shelter to displaced persons. Incorporating disaster resilient features to 'build back better' will be the guiding principle. This phase requires the most patient and painstaking effort of all concerned. The administration, the stakeholders and the communities need to stay focused on the needs of this phase, as, with the passage of time, the sense of urgency gets diluted. Emphasis will be laid on plugging the gaps in the social and economic infrastructure and infirmities in the backward and forward linkages. Efforts will be made to support and enhance the viability of livelihood systems, education, health care facilities, care of the elderly, women, and children, etc. Other aspects warranting attention will be roads, housing, drinking water sources, provision for sanitary facilities, availability of credit, supply of agricultural inputs, upgradation of technologies in the on-farm and off-farm activities, storage, processing, marketing, etc.

Point of Inquiry

1. The chapter should have details of the Damage assessment mechanism and scope for multi-sectoral joint needs assessment.
2. The chapter should mention restoration of basic infrastructure. This could be short term such as restoration of basic infrastructure including roads, bridges/culverts, drinking water supply schemes, electricity, communication network and roads/ paths leading to the villages; restoration/ repair of the lifelines/critical buildings –

repair/reconstruct the lifeline buildings /critical buildings which are necessary for treating the affected people or rehabilitation in these buildings as shelters.

3. There should be action points for reconstruction and repairs works and for short- and long-term recovery program which could focus on sectors such as drinking water supply, food, nutrition, health, education, housing construction and structural assessment, psychosocial support, agriculture, livelihood, water conservation, social forestry, and animal husbandry.
4. The chapter should aim to produce a road map for ensuring disaster resilient features to 'build back better' and making communities resilient to disaster and climate change.

Chapter 9: Financial Resource for implementation of DDMP

District Disaster Response Funds and District Disaster Mitigation Funds are proposed to be created at the District Level as mandated by Section 48 of the DM Act. The disaster response funds at the district level would be used by the DDMA towards meeting expenses for emergency response, relief, rehabilitation in accordance with the guidelines and norms laid down by the Government of India and the State Government.

Point of Inquiry

1. The chapter should ensure that all State Government Departments, Boards, Corporations, PRIs and ULBs of the district will prepare their DM plans, including the financial projections to support these plans.
2. The chapter should provide scope to DDMA to also look at other options of new financial tools like catastrophe risk financing, risk insurance, micro-insurance etc. to compensate for massive losses on account of disasters.
3. The chapter should provide space and opportunities for CSR/ NGO, other external stakeholder investments for increasing district resilience.

Chapter 10: Procedure and Methodology for Monitoring, evaluation, updating, and Maintenance of DDMP

Regular maintenance is critical to ensure the relevance and effectiveness of the DM plans. Plan maintenance is a dynamic process. The plan must be periodically updated to make it consistent with the changes in Government policies, initiatives, and priorities and to incorporate technological changes and global experiences. Evaluating the effectiveness of plans involves a combination of training events, exercises, and real-world incidents to determine whether the goals, objectives, decisions, actions, and timing outlined in the plan led to a successful response. In this way, the emergency preparedness exercises become an integral part of the planning process. The DM planners must be aware of lessons and practices from various parts of the district and elsewhere. The training, mock drills and exercises are crucial to evaluating the operational aspects of the plan, rectify gaps, and improving the efficiency of the plan.

The likelihoods of emergencies and actual occurrences are also occasions for evaluating the plan, making innovations, and for updating the plan, SOPs, and guidelines. At times, operations experience setbacks due to outdated information, ineffective procedures, incorrect role assignments, and outdated norms.

Point of Inquiry

1. The indicative guidelines for monitoring and evaluation, updating, maintenance, review of the DDMP are as follows –
 - i. Regularly review the implementation of the plan.
 - ii. Check the efficacy of the plan after any major disaster/emergency in the district and see what did work and what did not work and make amendments to the plan accordingly.
 - iii. As per Sub Section (4) of Section 31 of the Disaster Management Act, 2005, the plan should be reviewed and updated annually and the year in which the plan has been reviewed should be clearly mentioned in shape of header in each page of the plan.
 - iv. Keep District, State and National Disaster Resource Inventory updated (SDRN / IDRN) and connected with the plan.
 - v. Update coordinates of responsible personnel and their roles / responsibility every six months or whenever a change happens. Names and contact details of the officers/officials who are the nodal officers or the in-charge of resources to be updated on regular basis.
 - vi. Plan should be web enabled with access on intra and internet.
 - vii. Plan should be circulated to all stakeholder departments, agencies, and organisations so that they know their role and responsibilities and prepare their own plans.
 - viii. Regular Drills / exercises should be conducted to test the efficacy of the plan and check the level of preparedness of various departments and other stakeholders. It would ensure that all parties understand their roles and responsibilities clearly and understand the population size and needs of vulnerable groups.
 - ix. Regular training and orientation of the officers/officials responsible to implement the plan should be done so that it becomes useful document to the district administration.
 - x. Army, NDRF, SDRF and other agencies should be integrated into the plan exercise regularly.
 - xi. DDMA should hold Regular interaction and meetings with the Army or any other central government agencies for strengthening coordination during disasters.
 - xii. The DEOC should be made responsible for keeping the plan in updated form and collecting, collating, and processing the information.

Chapter 11: Coordination Mechanism for implementing DDMP.

Section 30 (2) of the DM Act 2005 envisages powers and functions to the DDMA to coordinate and monitor disaster management undertaken in the district by every office of the government of India and of the state government at the district level and local authorities. Inter departmental coordination amongst departments is a key for harmonious and effective working together of departments and other key relevant stakeholders towards a common goal. The inter-departmental coordination should focus on providing maximum impact for a given level of resources; elimination of gaps and overlaps in services; appropriate division of responsibilities, information management and uniformity in communication.

Point of Inquiry

1. This chapter is crucial as coordination encompasses all chapters of DDMP. Therefore, the following chapter should ensure –
 - i. Intra and inter-Department coordination mechanism with horizontal linkages
 - ii. Coordination mechanism for working with UN Agencies, NGOs, CSRs, CBOs, Self Help Groups (SHGs), Industries, private schools, and hospitals with horizontal and vertical linkages.
 - iii. Coordination with block/ village level Task Force(s) with vertical linkages as also inter-block and inter-village coordination with horizontal linkages
 - iv. Coordination systems with state departments and training institutes at state and district level
 - v. Intra-block and intra-village coordination
 - vi. Coordination with local self-government (Panchayat Raj - Zilla Parishad, intermediate level, if any, and Gram Panchayat and Urban Local Bodies) as per direction from DDMA
 - vii. Coordination and linkage with DDMPs of neighboring districts & with SDMP

Chapter 12: Standard Operating Procedures (SOPs)

Standard Operating Procedures (SOPs) are a common method of implementing instructions. SOPs supply response protocols for carrying out specific responsibilities. They describe who, what, when and how SOPs are proper for complex tasks requiring step-by-step instructions for performing a task. It is necessary to prepare and annex - SOPs for all relevant hazards to one 's district – like – Earthquake, Flood, Cyclone, Landslide, Tsunami, Manmade disasters (CBRN, Stampede etc.). All respective departments have a lion's share in making the SOPs themselves as per the context.

Point of Inquiry

1. SOPs and checklists should be prepared for various stakeholders for an effective response. These can be made based on the functioning of Emergency Support

Function (ESF) groups or IRS. Depending on the hazard profile and level of exposure the district should decide in a participatory way the number of ESF covering all the above.

2. The SOPs should clearly define the disaster situation.
3. There should be step by step action on receipt of warning and warning dissemination.
4. The details of how to activate/ deactivate IRS or ESF, DEOC and the aspects of resource mobilization and access to financial resources should be methodically articulated and mentioned.
5. All actions starting from crisis management situation, relief, responses until situation comes to normal should be listed sequentially along with responsible officer's designation.
6. The SOP should have an information dissemination and communication strategy.
7. There should be a clear procedure for VIP movement along with media management processes.
8. The SOP also should mention the procedures and process for seeking assistance from State/ NDRF/ Army/ Centre, etc.
9. The SOP should also mention the coordination with other stakeholders at various levels and time periods (relief, response, etc.).

Annexures

There are 21 annexures and 11 types of maps which are as follows. There could be more annexures added if required.

Sr. No	Details	Annexures
1	Terms	i. Definitions of commonly used terms
2	District Profile	i. Climate (temperature, rainfall, and weather patterns), vegetation, geological features (fault lines, mountain areas) topography (rivers, deserts) ii. Forests, agriculture, land use pattern, irrigation system and dams iii. Demography (size, growth trends, literacy rate, poverty level (BPL), income per capita, main occupations, gender, and vulnerable groups), iv. Society (religious, ethnic groups, social structure, situation of cohesion/conflict), v. Economy (key sectors, percentage of their share in economy, growth, and development trends), vi. Infrastructure and services (roads, telecommunications, hospitals, educational institutions, water sanitation etc), vii. Shelter, if any (number, types, and estimated ability)- Flood/Cyclone Shelters or Earthquake resilient Bunkers

		viii. Political system and social systems (local government system, councils, etc) ix. Administrative system (administrative units, number of blocks, Gram Panchayat, villages) in the district.
3	Lists	<ul style="list-style-type: none"> i. List of vulnerable talukas and villages with risk ranking (hazard-wise) ii. List of resources available in district (public and private) iii. List of infrastructure in the district (public and private) such as police stations, shelters etc iv. List of NGOs, CBOs List of public Volunteers – their areas of specialty and capabilities v. List of Trained Personnel, machinery & equipment available in the district with different stakeholders vi. List of emergency supplies needed along with contacts for emergency suppliers. vii. List of Radio & TV stations contacts viii. Distribution List (the agencies/individuals to whom the plan will be distributed) ix. List of Acronyms
4	Plans, Policies	<ul style="list-style-type: none"> i. Laws and policies related to DRR ii. Shelter Management Plan iii. Evacuation plan iv. Media Management Plan v. Medical and Hospital Management Plan vi. Mitigation Plan
5	Directory	<ul style="list-style-type: none"> i. Directory of departmental focal points for emergency response
6	Formats	<ul style="list-style-type: none"> i. Formats for post disaster damage, loss, needs and capacity assessment. ii. IRS Formats
7	Maps	<ul style="list-style-type: none"> i. District maps political and physical (e.g.: if the district is prone to floods or landslides the physical map may indicate the area affected in previous floods) ii. District Administrative map showing division and its area. iii. District Map showing distribution of population, houses, crops etc iv. District Hazard Map with hazard zonation on GIS base v. District map showing vulnerability profile. vi. District map showing Capacity and resource profile. vii. District map showing Risk profile. viii. District Map showing critical infrastructure and installation in the district such as roads, rail network, airports and seaports, nuclear installations. ix. District Map showing important administrative buildings, hospitals, schools, monuments. x. District map showing forest and agriculture areas. xi. Add more if necessary

DDMP Review Matrix

The documentation of the review can be summarized using a matrix with chapter wise findings, observations and Gaps are analyzed through points of inquiry. Based on the findings, recommendations are made.

The Matrix could be one of the tools for presentation. It is recommended that any other tools could also be used for documentation, provided the findings and recommendations are well articulated and presented in an effortless way for the reader to understand.

Chapter No	Title	Observations/ Findings/ Gaps	Recommendations
Chapter 1	Introduction		
Chapter 2	Hazard Vulnerability Capacity Risk Analysis (HVCRA)		
Chapter 3	Institutional Arrangements for Disaster Management (DM)		
Chapter 4	Prevention and Mitigation Measures		
Chapter 5	Preparedness Measures		
Chapter 6	Capacity Building and Training Measures		
Chapter 7	Response and Relief Measures		
Chapter 8	Reconstruction, Rehabilitation and Recovery Measures		
Chapter 9	Financial Resources for implementation of DDMP		
Chapter 10	Procedure and methodology for monitoring, evaluation, updating and maintenance of DDMP		
Chapter 11	Coordination mechanism for implementation of DDMP		
Chapter 12	Standard Operating Procedures and Checklist		
Annexures	Terms, District Profile, Lists, Plans, Polices, Formats, Directories, Maps		

Example Of Matrix Used for Osmanabad District DDMP Review

Chapter 1: Introduction

Observations/ Findings/ Gaps	Recommendations
<ul style="list-style-type: none"> • The objectives indicate relief centric response and preparedness driven. • Basic background of the district, administrative set up, methodology, Potential stakeholders and their roles, usage, and periodicity of DDMP is absent in the DDMP. • As standard practice the DDMP has to be developed in a consultative process of DDMA. This chapter does not have mention of the team members. • Capacity development components missing in the DDMP objectives. • The description on communication methodology, institutional setup and pre-during-post action is not expected to be part of this chapter 	<ul style="list-style-type: none"> • The objectives should be Specific Measurable Achievable Realistic & Time bound (SMART) covering all the stages of disaster management cycle. • The objective also can refer to SFDRR goal of substantial reduction of disaster risk and losses in lives, livelihoods, and health and in the economic, physical, social, cultural, and environmental assets of persons, businesses, communities, and countries. • The objectives shall include Hazard Vulnerability Capacity and Risk Assessment (HVCRA), prevention, mitigation, preparedness measures, response plan. • It is also important to refer to four priority action of SENDAI Framework of actions which provide value additions for enhanced DRR actions at district level. • Capacity building and resource mobilization are essential for enabling risk reduction actions. An objective about capacity development should be incorporated explaining capacity development plan from community to district level. This capacity development plan may consider learning needs of community leaders, PRIs, ULBs, Block and District officials and NGOs. • The DDMP shall be formulated in consultation with the stakeholders. An objective on the involvement and coordination of multiple stakeholders should be incorporated. • The DDMP should have executive summary on generic profile of the district (physical boundaries, administrative setup, census details, etc), methodology, potentials stakeholder’s list and their roles, usage of district plan, approval mechanisms and periodicity of DDMP. •

Annexure 2:

UNICEF-UNDP Joint Action Plan for Risk Informed Programing to provide technical assistance to the Government of Maharashtra

Background

United Nations' agencies have been extending support to the Government of Maharashtra since over 60 years now. United Nations Development Programme (UNDP) and United Nations Children's Fund (UNICEF) have been supporting the department of Relief and Rehabilitation Department for designing various schemes related to DRR and assisting in their its implementation. As per the mandate of the Sendai Framework as well as its predecessor, the Hyogo framework, there is an urgent need to have Risk Informed Programming into the mainstream developmental Planning and Policy of the Government of Maharashtra. According to the UN's Sendai Framework of Action (SDG (Sustainable Development Goals)) it is critical to have Risk informed policies and planning to achieve the 17 goals to end poverty, protect the planet and ensure that people enjoy peace and prosperity. To ensure the implement the SDGs in the realm of Risk Reduction, the Sendai Framework of Action (SFA) was signed off by all the UN member countries. The SFDRR has 4 priorities *viz.*

Priority 1. Understanding disaster risk

Disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Such knowledge can be used for risk assessment, prevention, mitigation, preparedness, and response.

Priority 2. Strengthening disaster risk governance to manage disaster risk

Disaster risk governance at the national, regional, and global levels is particularly important for prevention, mitigation, preparedness, response, recovery, and rehabilitation. It fosters collaboration and partnership.

Priority 3. Investing in disaster risk reduction for resilience

Public and private investment in disaster risk prevention and reduction through structural and non-structural measures is essential to enhance the economic, social, health, and cultural resilience of persons, communities, countries, and their assets, as well as the environment.

Priority 4. Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation, and reconstruction.

The growth of disaster risk means there is a need to strengthen disaster preparedness for response, act in anticipation of events, and ensure capacities are in place for effective response and recovery at all levels. The recovery, rehabilitation and reconstruction phase are a critical opportunity to build back better, including through integrating disaster risk reduction into development measures.

The National Disaster Management Authority, Ministry of Home Affairs of India is a signatory to the to SFDRR and it is instrumental in the implementation of various schemes and programs to achieve the priorities. The National Disaster Management Act, of 2005 also contains provisions to meet the priorities of the Sendai Framework of Action. According to the National Disaster Management Act, of 2005, “disaster management” means a continuous and integrated process of planning, organizing, coordinating, and implementing measures, which are necessary or expedient for—

- i. Prevention of danger or threat of any disaster;
- ii. Mitigation or reduction of risk of any disaster or its severity or consequences;
- iii. capacity-building;
- iv. Preparedness to deal with any disaster;
- v. Prompt response to any threatening disaster situation or disaster;
- vi. Assessing the severity or magnitude of effects of any disaster.
- vii. Evacuation, rescue, and relief.
- viii. Rehabilitation and reconstruction.

Section 40 of the DM Act mandates all the state-level departments to have Disaster Management Plan for the line departments and review and update the plan annually. Currently, only the Department of Agriculture has a Disaster Management Plan, and the state is in the process of preparing Disaster Management Plans for other state-level departments. In this regard, UNDP has been appointed to support the State Government to assist the State in preparing the Disaster Management Plans of the Departments.

In retrospect the State Government has a joint agreement with UNICEF to enhance the Risk Governance in the State, under which a pilot project was carried out in Osmanabad and Beed districts and a Participatory Risk Analysis of 7 Social sectors was carried out. The stakeholders involved in this process were right from grass root workforce to the district-level HODs. The seven social sectors were Agriculture, Public Health, Civil Supply, Child Protection, Integrated Child Development Scheme, Rural Water Supply, and Sanitation. The risk analysis was done in a participatory manner was done by forming working groups at the departmental level which included representation from frontline workers, block-level officers/staff, and district-level officers/staff including the Resident Deputy Magistrate and Head of Departments. This was a successful model where in the officers who have the best understanding of the subject matter identified Risks. Furthermore, after a detailed orientation and training

of the officers, the officers also identified the possible mitigation process. This was a three-day process spread across 3 to 4 months and the officers had to go back to work find data think through concepts and come back and then make a plan for risk mitigation. As an outcome of this process, it the risk analysis and the departments owned the proposed mitigation measures, which enables a higher chance of it getting implemented.

Objective

The overall objective of this Partnership is to strengthen Disaster Risk Governance in Urban and Rural contexts at State and Divisional/ward level in Maharashtra through technical and capacity-building support to the Relief and Rehabilitation Department, Government of Maharashtra.

Key Action Points

In the current scenario where in UNDP and UNICEF will be supporting the Government of Maharashtra in drafting the Departmental Disaster Management Plans, a similar work activity can be carried out for few departments where the involvement of departments is necessary. Various level officers from the state level Departments of Government and the process of making the Departmental Disaster Management Plan can be carried out. The further detailing of working group members can be decided in consultation with the Head of the Departments respective departments. In order to link the working plan to the field and scale up the pilot project carried out by the Government of Maharashtra and UNICEF on the Departmental Disaster Management Plan at Osmanabad. Coordinated with the state-level departmental plans working groups of 3-line departments will also be formed at the division level. Working at one division (Aurangabad) will enable the Departmental Planning Process to be linked at the local and the state level. A commissioner or a JS-level officer will be appointed as a nodal officer and the nodal officer shall be responsible to be instrumental in setting up the link of the plan. UNICEF and UNDP will be assisting the Government in making the plans; however, the ownership shall stay with the respective line department.

At the district level, the nodal person for Disaster Management for the District Disaster Management Authority (DDMA) is the District Disaster Management Officer (DDMO). The DDMOs' work was coordinated with the Hyogo framework of action which is now updated to the Sendai Framework and the Sustainable Development Goals. In order to handhold the DDMOs to work in line with newer strategies that are coordinated with the policies of the National Disaster Management Authority (NDMA), a series of training shall be carried out for the DDMOs. Four annual trainings will be carried out as per the convenience of the Government, which will have training activities involving group work, crosspieces of training learning, situation analysis, and other interactive learning tools. A DDMO workshop was held by UNICEF in March 2019, to assess the

training needs of the DDMOs, these trainings will be coordinated with the gaps identified in the national frameworks and the understanding of the DDMOs, which were highlighted in the Training Need Assessment workshop. In addition to the physical training session, 4 refresher training will be held through the online portal available with the Government. A workshop of Resident Deputy Collectors (RDC) will have to be conducted for their sensitization as the CEO of the DDMA and guide the DDMOs in implementing the National Policies.

The State Emergency Operations Centre (EOC) is now fully equipped and is well connected with the District EOC. However, the state is yet to establish a mechanism to connect to the last mile effectively. With information inputs available from IMD, Maha Vedh, INCOIS, IITM – Pune, and other such Government Institutions & nodal agencies, a plan can be made for last mile connectivity for disseminating the Early warnings for various emergencies. UNICEF and UNDP will provide technical assistance to the Relief and Rehabilitation Department, Government of Maharashtra to plan for the last mile connectivity.

Designing and developing programmes for engaging volunteer commitment from various level professionals for Disaster Risk Reduction - In accordance with the volunteer commitment made under the Sendai Framework of action, designing a plan of action and engaging partners for the promotion, and incentivising of volunteerism which will support the SDMAs and DDMA. Various activities need to be formulated to develop a mechanism to enable volunteerism at field, local administration, and policy level.

The Disaster Management Department (DMD) of Municipal Corporation of Greater Mumbai (MCGM) is the nodal agency for implementation of the NDMA guidelines and the Sendai Framework for the two districts of Mumbai. Due to the dynamic and vast nature of the jurisdiction the DMD also holds capacity to extend support in the Mumbai Metropolitan Region (MMR) at the time of any emergency. The DMD, MCGM has established a City Disaster Management Institute (CIDM) which is one of its kind in Asia. As a part of Urban Risk Informed programming, UNICEF conducted a 4-day workshop on Urban Resilience and effects of Climate Change, a module for the same has been made. Further to this support to the MCGM, it has been requested by MCGM that UNICEF extends support for technical support for conducting workshops for MCGM officers from various departments, all the training infrastructure including accommodation of trainers will be taken care by MCGM and the subject experts will be invited by UNICEF. UNICEF and UNDP will be jointly arranging for these resource persons who are technically skilled and will be able to impart the trainings as per the demands of the MCGM. The CIDM has drafted 10 training modules, these modules will be tested and updated through the trainings which will be held in MCGM.

Deliverables

A. Technical support to Disaster Management Unit (DMU), Government of Maharashtra to make Departmental Disaster Management Plans for selected Departments.

This includes.

- i. Consultation with Relief and Rehabilitation Department for identification of departments and working group composition.
- ii. Capacity building of Working group to facilitate State level Departmental Disaster Management Plans for selected state departments.
- iii. To work with the working groups formed within the respective departments and conduct risk analysis.
- iv. Drafting the Departmental Disaster Management Plans with financial implementation on the Department of Government.
- v. Draft plan of action for professional volunteerism
- vi. Establishing the link between the state level Disaster Management Plans and the Division level plans for the Aurangabad division.

B. Training and capacity building of the District Disaster Management Officers (DDMO) according to the requirements of the Sendai Framework of Action and the sustainable development Goals.

- i. Orientation programme of for all the Resident Deputy Collectors
- ii. Four quarterly training workshops for the division level with DDMOs.

C. Preparing Action plan for establishing the state of art Early Warning System for effective last mile connectivity

D. Series of training with various line departments within the Municipal Corporation of Greater Mumbai at the City Institute of Disaster Management.

- i. Updating the training manuals for selected MCGM departments
- ii. Conducting trainings for selected officers of the selected department offices

Major Tasks and Deliverables

Sr. No.	Deliverables	Activities	Timeline	Responsible agency
1.	3 Departmental Disaster Management Plans at the state level	GR for State Level working groups	31 st June 2019	GoM
		Holding meetings of the working groups for formation drafting the Departmental Disaster Management Plan	31 st December 2019	GoM, UNDP and UNICEF

		Drafting the Disaster Management Plan of the line department and submitting for review of the R&R department	31st December 2019	GoM, UNDP and UNICEF
2.	Capacity building of District Disaster Management Authorities and the relevant officers	1 workshop for all RDCs	31 October 2019	GoM, UNICEF and UNDP
		4 workshops for all DDMOs.	31 June 2020	Government of Maharashtra, UNICEF, and UNDP
3.	Plan for Last mile connectivity during emergency management	A work plan for ensuring last mile connectivity during the Emergency situation	30 September 2019	GoM, UNDP and UNICEF
4.	Promoting citizen volunteering	Drafting a plan of action for volunteerism at state, local and grass root level.	31 st January 2020	UNICEF, UNDP, GoM
5.	Based on the training needs of the various departments of MCGM impart trainings and strengthen the existing modules at the City Disaster Management Institute, Mumbai and impart trainings	Identifying line departments in consultation with MCGM and reviewing the existing modules.	30 June 2020	MCGM, CIDM, UNICEF and UNDP
		Conduct five 4 to 5 days of training based on the requirement of the module	30 June 2020	MCGM, CIDM, UNICEF and UNDP

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